

CHAPTER - I

INTRODUCTION

1.1 Background

Nepal remains predominantly agrarian economy. About 65.6 percent of its population is engaged directly or indirectly in agriculture as a major occupation which accounts for 31 percent of the GDP (MoAD, 2016). Of the total population of 26.7 million, almost 80 percent reside in rural areas and are employed in agriculture. However, agriculture suffers from low labor productivity as evidenced by two-thirds of nation's labor force employed in agriculture contributing nearly one-third of GDP (NARC, 2016). The prime goal of the government at present is to reduce the poverty and improve the livelihood of the people. Agriculture could be the major contributing sector for achieving this goal and dairy could be the potential sub sector. There is tremendous market of milk product that almost 500000 liters fluid milk daily is deficit in domestic market (NDDDB, 2014) and the government policy to increase production and productivity of livestock related products. The work potential aged youths are roaming for job and preferred occupation and drying is the most liked occupation. Surrounding with the two big giant economies, Nepal could cash booming economy with dairy sector development and the DDC could assemble milk producing farmers for strong organization for the welfare of member farmers through MPCs.

Livestock is an integral component and subsector of farming system in Nepal. It contributes about 11 percent to the total national gross domestic products (GDP) and 26.8 percent to the agricultural GDP (MoLD, 2016). It was estimated that the livestock share of agricultural GDP will reach 45 percent by the end of 20 years of the Agricultural Prospective Plan (APP) that is ended by fiscal year 2014/15, though this cannot be achieved. However, livestock plays important role in human food and nutritional securities, livelihood, regional balance, gender mainstreaming, and rural poverty alleviation in Nepalese economy. Considering the importance of this sector in economy, the Government of Nepal (GoN) has formed a separate Ministry of Livestock and Poultry Development (MLPD) in December 2015 to prioritize the activities of the livestock subsector (DLS, 2016).

Within the livestock sector in Nepal, the dairy subsector is the most important one in terms of its contribution to AGDP. It contributes almost 9 percent to AGDP and the dairy subsector contributes more than 60 percent of the livestock sector of AGDP. The demand of milk has increased 8 percent whereas the production is only 3.29 percent annually. Nepal is highly potential of dairying where cattle and buffalo population is 72, 41,743 and 51, 67,737 respectively. Cattle and buffalo produce 5, 57,679 and 11, 67,154 metric ton milk per year respectively (MoAD, 2016). The dairy sector in Nepal is predominantly through the smallholder production system. Nepalese farming system has different components. Integration of livestock, crops, horticulture agro-forestry, fisheries, and so on is the unique characteristic of Nepalese farming system. Farmer keeps livestock for farm power, manure, family food supply, income generation religious purpose and more. Crop and livestock farming are dependent each other. Livestock provides farm power and fertilizer (compost) for crop farming. Crop by products for example straw, Stover, hay, husk, bran etc. are used to livestock as feed.

Regarding the facts of cattle farming, there is an opportunity to developing dairy farms in our country. It helps to open the gate of commercialization in dairy farming as well as in agriculture. Dairy is the most important sub sector in Nepalese livestock production, providing almost two-third of the livestock sector GDP and 9 percent to national GDP. The sub sector provides employment for more than half million farm families in production and further more than 10000 in processing and marketing. The dairy sub sector not only provides employment and income generation opportunities but also ensures flow of money from urban to rural sector (RAN, 2016).

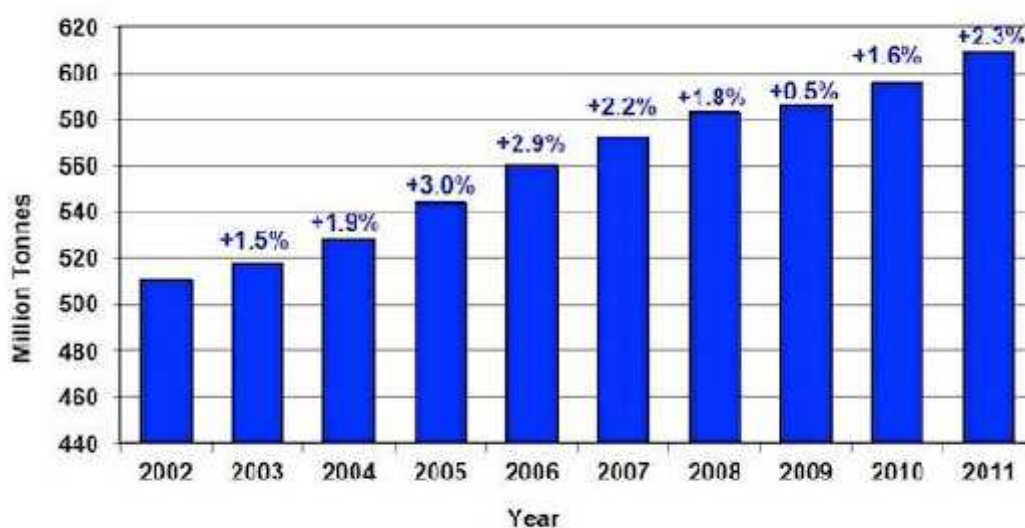
Nepal is divided into three climatic regions; Tarai, mid Hill and Mountain. Mid Hill is potential region of cattle farming due to suitable climatic factors. Milk marketing is difficult in mid hill region. To overcome this problem buffalo farming is preferred due to its high fat contains in milk. Yak and Chauri (Yak in English, a long haired domesticated bovid found throughout the Himalayan region of Nepal)

Milk is used to make ghee and Churpi (traditional Nepalese cheese made from Yak's milk) from the Mountain region. Geographically, Nepal is apt for dairy industry particularly in Hilly and Mountain regions.

1.1.1 World Dairy Sector Outlook

World milk production during 2015 is 804.5 million MT compared to 721 million MT during 2010 with growth rate of 2 percent. The growth in global milk production varied considerable between countries. Cow milk represented 83 percent of the total milk produced globally whereas buffalo milk production making 13 percent of total milk production. India and Pakistan produce more than 90 percent of the total volume of buffalo milk (93 million MT), but smaller volumes are also produced in Egypt, China, Iran, Italy, Nepal and South East Asian countries. In most of the Asian countries, the milk production growth is increasing due to the rise in income and relative price of the commodity. The evolution of the dairy production in India is widely regarded as a success story with small scale farms as fundamental to the dairy agricultural system (FAO, 2009).

Figure 1.1: World Milk Production



Source: South Asian Association Regional Co-operation (SAARC) Dairy outlook, 2015

The rapid growth of the livestock sector, including dairy, in large parts of the developing world has been essentially demand-driven (FAO, 2012). The factors that have encouraged growth in developing countries are: rising incomes and urbanization and population growth. All developing country regions are projected to see sustained growth in production, with the highest rates of growth in sub-Saharan Africa and India. Growth in China is projected to slow as the industry has matured. The estimated

and actual production and growth rate of India is 118815 (thousand MT) and 3.4 respectively. The growth rate of milk production in developed and developing countries is 1.2 percent and 2.7 percent. Following table shows the world milk production during the year 2015 as:

Table 1.1: Milk Production by Continents in 2015 (in Thousand MT)

Continents	Milk Production (in MT)	Imports	Exports
Africa	46612	10176	1289
Americas	193649	10568	19194
Asia	313370	42877	6570
Europe	220100	68082	26558
Oceania	30780	923	23507
Developed countries	388877	12023	61216
Developing countries	415640	70626	74118
World	804517	70626	74118

Source: Food and Agriculture Organization of the United States Nation, Reports 2015

As shown in table 1.1, the share of Asia in global milk production is highest (313370 thousand MT), followed by followed by Europe (220100 thousand MT), Americas (193649 thousand MT), Africa (46612 thousand MT) and Oceania (30780 thousand MT). The milk production gaps between developed and developing countries is almost double of developing countries (415640 thousand MT) than the developed countries (388877 thousand MT).

But in the import and export side, Europe exports highest quantity (26558 thousand MT), followed by Oceania (23507 Mt), Americas ((19194 thousand MT), Asia (6570MT) and the Africa (1289MT).

1.1.2 Milk Production in SAARC Member Countries

In the last three decades, world milk production has increased by more than 50 percent, from 500 million tons in 1983 to 769 million tons in 2013 (FAO, 2016). Asia is accounted for most of the increase, with output in India, the world's largest milk producing country, by producing 132.2 million tons in 2012-2013 (Siddiky & Tareque, 2014). Developing countries are house of two-third of world dairy herd but contribute to one-third of the world milk production (Siddiky, 2015). The most significant milk producers in developed countries are European Union and the United States. In devel-

oping countries India and China rank first and second, respectively in milk production. The growth rate of milk production in India, china, Pakistan, Argentina and Brazil shows future prospects (SAARC Dairy, 2015).

The world average level of consumption of milk and milk products in 103.6 kg/capita/year and it is expected to increase in both developing and developed countries (FAO, 2016). Although the SAARC region contributes a considerable portion of milk to the world's milk pool, the productivity of animal remains low. In 2011 the world milk production stood around at 730 million tons, of which the SAARC countries contributed 165.4 million tons (22.66%). About three-fourth of the milk produced in the region is contributed by India alone. Next major contributor for milk production is Pakistan, which produced about 22.14 percent of the total milk produced in the region. All the other countries in the region contributed to the remaining part of the total milk produced (Siddiky, 2015).

The average growth rate in total milk production in the SAARC countries between 2006 and 2011 was 4.11 percent. The milk production was 132.64 million tons, which increased to 165.40 million tons in 2011 with the average growth rate of 3.89 percent.

1.1.3 Milk Production Trend in SAARC Countries

In 2006, the total milk production in Afghanistan was 1.62 million tons, which increased to 1.72 million in 2011. The average growth rate in milk production between these periods was 1.04 percent. Bangladesh produced 2.69 million tons of milk during 2006, which increase to 3.33 million in 2011 with the annual growth rate of 3.94 percent during this period and finally milk production reaches around 5 million tons in 2013. The milk production in Bhutan was 0.042 million tons in 2006 and the total milk production decreased to 0.039 million tons in 2011 with average growth rate of -1.41 percent. India witnessed a positive average growth rate of 4.26 percent in milk production from 2006 to 2011. The milk production increased to 121.8 million tons in 2011 from 97.0 million tons in 2006 (SAARC Dairy Outlook, 2015).

Nepal also showed a positive trend in milk production. The average growth rate of milk production during the period from 2006 to 2011 was 3.02 percent. In Nepal, the total milk production increased from 1.38 million tons in 2006 to 1.63 million tons in 2011. Pakistan produced 31.18 million tons in 2006, which increased to 36.62 million tons in 2011. The average growth rate in milk production between these periods was

sey, Holstein, and Brown-Swiss, Ayrshire and Sahiwal and their cross-bred cows; whereas the buffalos included local, improved such Murrah and their crosses.

Following table shows the dairy sector in Nepal on the FY 2014/15 as;

Table 1.2: Nepal Dairy Sector at a Glance

Total Dairy Animal	12409480
Cattle	7244743
Buffalos	5167737
Milking cattle	1025947
Milking Buffalo	135164
Milk (in MT)	1724823
Cattle Milk	557669
Buffalo Milk	1167154

Source: Statistical information on Nepalese Agriculture- 2014/15, MoLD

Contribution to AGDP	33% (nearly one-third)
Consumption per capita (in liter)	66.7
Distribution of Milk	
Formal	20 %
Informal	30%
HH retention	50%

Source: Ministry of Livestock Development, Government of Nepal (2015).

As shown in table 1.2, Nepal is importing considerable amount of milk and milk products. These products included, milk and cream powder, butter, butter oil, milk and cream liquid, modify whey, cheese and others. The Dairy sector has contributed nearly 33 percent of the AGDP and 8 percent of total GDP.

1.1.5 Per-Capita Milk Availability

The per capita milk availability in Nepal is 66.7 liter (around 67kg) which is far below the 250g/day (91 kg/annum) recommendation of WHO (NDDDB, 2016). The per capita of milk availability in developed world is 222kg.

Table 1.3: Projection on Annual Growth Rate Required to Meet Milk Consumption Recommended by FAO/WHO

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Milk production(MT at current growth	1556510	1610988	1665466	1719944	1774421	1828899	1883377	1937855	1992333	2046811
Human population	26620809	26993500	27366192	27738883	28111574	28484266	28856957	29229648	29602340	29975031
Per capita availability	58.5	59.7	60.9	62.0	63.1	64.2	65.3	66.3	67.3	68.3
Milk production (5% Annual growth	1556510	1634336	1712161	1789987	1867812	1945638	2023463	2101289	2179114	2256940
Per capita availability	58.5	60.5	62.6	64.5	66.4	68.3	70.1	71.9	73.6	75.3
Milk production (7% Annual Growth	1556510	1665466	1774421	1883377	1992333	2101289	220244	2319200	2428156	2537111
Per capita availability	58.5	61.7	64.8	67.9	70.9	73.8	76.6	79.3	82.0	84.6
Milk production (9% Annual growth	1556510	1696596	1836682	1976768	2116854	2256940	2397025	2537111	2677197	2817283
Per capita availability (kg)	58.5	62.9	67.1	71.3	75.3	79.2	83.1	86.8	90.4	94.0

Source: Nepal Dairy Development Board, Government of Nepal, Milk Marketing Strategy Report (2016)

Among the south Asian countries, Pakistan has highest per capita milk availability (230kg), followed by India (98kg). Per capita availability of milk in Bangladesh (18kg) and Sri Lanka (33kg) is below compared to the figure in Nepal. It has been estimated that annual milk production growth rate of 8-9 percent is required to meet the FAO/WHO recommended per capita consumption of milk (table 1.3).

1.1.6 Current Demand and Supply Situation of Milk and Milk Products

Dairy farmers, on average, supply around 700,000 liters of milk per day to dairy companies. But the country's daily demand for milk hovers around 800,000 liters. The country is currently facing shortage of milk because of lean milk production season. Lean milk production season stretches from April to August in the country. There is gap between the production and consumption of milk in Nepal. Nepal is importing nearly tangible amount of milk products from other countries. Despite the import of large quantity of milk products, there is deficit of nearly 3 Lakhs liters milk per day across the country (NDDB, 2016).

Table 1.4: Import of Dairy Products from Various Countries (QTY in MT and Value in Million US\$)

Countries	2014		2015	
	QTY	Value	QTY	value
India	4212.70	10.15	3455.14	9.69
New Zealand	512.19	1.07	317.2	0.89
Australia	90.66	0.17	137.82	0.28
Singapore	219.6	0.51	121.69	0.27
Netherlands	273	0.49	122.93	0.26
China	311.6	0.5	67.4	0.14
Germany	14.99	0.08	69	0.14
Thailand	16.79	0.01	7.94	0.02
Denmark	16.83	0.02	13.02	0.02
Total	5668.36	13	4312.14	11.71

Source: Nepal Overseas Trade Statistics /Department of Custom, (2015)

Consumer price of milk is increasing in marathon style and beyond the purchasing power of low income people. Similarly, cost of milk production is also increasing and sometimes farmer expressed the opinion to withdraw the animal husbandry occupation.

Production, however, rises to around 875,000 liters/day during peak season which continues from September to March. It has been reported that around 300,000 to 600,000 liters fluid milk is deficit in the country (NDDDB, 2016).

The annual milk production is going up by around 4 percent, whereas annual demand is jumping by 8 percent (MoLD, 2016). To fulfill this deficit, Nepal has relied on powder milk to produce milk. Domestic dairy companies generate powder milk using surplus milk stored during the flush season. But powder milk produced in the country during flush season is not sufficient to cater to the demand during lean milk production season. As a result around 20 percent of the powder milk demand during the lean milk production season is meeting through imports from India and other countries (table 1.4).

Till 2015, dairy farmers produce around 4.8 million liters of milk per day. Of this, 15 percent is supplied to daily companies, 35 percent is supplied to restaurants and other entities, and remaining 50 percent is consumed by farmers themselves.

1.1.7 Import and Export Situation of Dairy Products

Nepal is net importer of dairy products importing more than 8000 MT of skimmed milk powder, 4000 MT whole milk baby food and 3000 MT of condensed milk annually (NDDDB, 2015). Sizeable amount of cheese and ice cream are also imported in the country whereas ghee is only the product exported from the country in substantial amount beside yak cheese in small quantity. The skimmed milk powder has dropped down significantly due to increasing supply of milk in formal sector and establishment of powder milk plant within the country.

There is considerably high gap between the demand and supply of milk and milk products this demand and supply gap may further widened with rapid urbanization, changing food habits and improving economic status. Currently, the real figures on import of milk products such as SMP to reconstitute into fluid milk and other dairy products are also lacking. The monetary value of total dairy products imported during 2008/09 was around 1 billion rupees which dropped to around 860 million during 2009/10 again slightly increased to NRs 915 million during 2010/11 whereas the export of dairy products particularly ghee and some yak cheese remained more or less constant at NRs 136 million (GOEC-NDDDB, 2012). Following table shows the import export of milk and milk products of Nepal as:

Table 1.5: Import and Export of Milk and Milk Products (2012/13)

particulars	Import from India	Import from third country	Total import	Export to India and third country
Fresh Milk	333619	-	333619	-
SMP and condensed milk	3075763	445864	3521627	50000
Butter and ghee	626510	167620	794130	565557
Cheese	99516	832221	182737	1800
Other dairy products	70465	11223	81688	2357

Source: Nepal Dairy Development Board, Milk Marketing Strategy Report (2013)

DDC, which has major stake in Nepal's dairy industry, has been supplying 140,000 liters of milk across the country every day. It supplies 110,000 liters of milk in the Valley on a daily basis (Himalayan Times, 2017). Thus Nepal is annually importing of milk and milk products worth more than 1 billion rupees.

1.1.8 Historical Background of Dairy Development in Nepal

Nepal is one of the least developed countries (LDCs) in the world with a gross national product (GNP) per capita of about US\$ 762 in 2016 as per United Nations criteria. Nepal is in the process of transforming itself from unitary system to a federal democratic structure. As of 20 September 2015, with the formed of new constitution, Nepal is declared as the Federal Democratic Republic, divided 7 states and 77 districts. It has 753 local units, 4 metropolises, 13 sub metropolises, 246 municipal councils and 481 village councils.

Dairy development is sustainable, equitable and powerful tool for achieving economic growth, food security, and poverty reduction because dairying provides regular sources of income, nutritious food, diversifies risk, improves the uses of resources, generates on - an off farm employment, creates opportunities especially for women e.g. milk money, and it provides financial stability and social standing e.g., store saving, asset creation, (FAO, 2010). Globally, livestock contributes about 40 percent to the agricultural gross domestic product (GDP) and contributes about 30 percent of the agricultural GDP in developing world (World Bank, 2009).

Organized dairy development activities in Nepal began in 1952 with the establishment of a Yak cheese factory in Langtang of Rasuwa district under Food and Agriculture Organization (FAO) assistance in 1953. In 1954, a Dairy Development Section was established under the development of agriculture (DoA) and also a small-scale milk processing plant was started in Tushal, a village of Karve district. In 1955, a Dairy Development Commission was formed (FAO, 2010).

The First Five Year Plan (1956-61) stressed on the need to develop a modern dairy industry. Accordingly, in 1956, a central dairy plant, with an average milk processing capacity of 500 liters/hr. was established in Lainchour, with the financial assistance from New Zealand and technical assistance from FAO. Around the same time, a second mini milk processing plant was established at Kharipati, in Bhaktapur district. The plant started processing of milk and marketing activities from 1958. In the process, prior to 1960, two additional cheese factories were established under the DoA in other two alpine districts of the country. In 1960, a Cheese Production and supply Scheme was also established. The Dairy Development Commission was converted to the Dairy Development Board in 1962. So as to meet the growing demand for milk in

Kathmandu, the Board was converted to Dairy Development Corporation (DDC) in 1969 (FAO, 2010). In 1981 under the DDC, Milk Producer's Associations (MPAs) were established to increase the participation of farmers in dairy development in an organized way. Later the MPAs were transformed into Milk Producers' Cooperatives (MPCs). A skim milk powder plant with 1000 tons per day capacity was established in Biratnagar on the recommendation of the Ten Year Dairy Development Plan (1991-2000). In 1992, Government of Nepal established a National Dairy Development Board (NDDDB) to assist dairy development (Pradhan, 2005).

The dairy related institutions in Nepal are playing the important role to nourish the dairy sector development directly. They are:

- Dairy cooperatives (including MPAs, MPCs, DMPCUS, CDCAN)
- Dairy Development Corporation (DDC)
- National Dairy Development Board (NDDDB)
- Department of Livestock Services (DLS)
- Department of Food Technology and Quality Control (DFTQC)
- Department of Cooperatives (DoC)
- National Cooperative Development Board (NCDB)
- Private Sector (including cooperatives like, Nepal Dairy, Himalaya Dairy, Sitaram Dairy, Anmol Dairy, Kathmandu Dairy, Aadhunik Dairy etc in Kathmandu Valley; Sujal Dairy in Pokhara Valley, and Kamadhenu Dairy in Sunsari.

1.1.8.1 Introduction to DDC

Dairy Development Corporation (DDC) is a leading Government-owned dairy industry founded in 1969 under the Corporation Act 1964. It is an enterprise popularly known for collecting milk, producing dairy products and distributing them to urban consumers. At establishment the DDC had fixed capital of 1.65 million. When DDC started its operation it had one milk plant at Lainchour called Kathmandu Milk Supply Scheme (KMSS) and four yak cheese production plants in the mountains under the cheese production and supply scheme. The capacity of Lainchour dairy plant, called Central Dairy, was increased from 500 to 1000 liters per hour in 1960/61 as a result of increased demand for processed milk to meet demand; the Dairy Development Board was transformed into the Dairy Development Corporation. Thus, at the establishment the DDC had only one milk Supply Scheme and four yak cheese production plants in

the mountains under the cheese production and Supply Scheme (Sapkota, 1985). Initially, it was financially supported by foreign grants and loans at a rate of interest. Major donors are the United Nations' World Food Program (WFP) New Zealand, and the Netherlands. The DDC has long-term loans from Denmark, ADB and World Bank. The DDC took loans to expand chilling and processing facilities by importing machinery and equipment (Sapkota, 1985). The objectives of this corporation are:

- Provide a guaranteed market for milk to the rural farmers with fair price.
- Supply pasteurized milk and dairy products to urban consumers.
- Develop organized milk collection system to meet demand for pasteurized milk and milk products.
- Develop an organized marketing system for milk and milk products in urban areas
- Organize and promote milk producer' associations.

In order to meet these objectives, DDC collects milk from farmers and dairy cooperatives, processes it and distributes to urban consumers through its own retail chain and other independent distributor.

The DDC has gradually established various milk supply schemes with chilling centers. At present, it has a milk collection network in 44 districts, 8 Milk Supply Schemes (MSSs), 65 chilling centers and 16 cheese production centers throughout the country. Almost 1200 Milk producers' co-operatives (MPCs) are supplying the 200 thousand liters/day milk to urban Nepal directly through DDC. Similarly, there are altogether 837 staffs in this corporation including technical and administrative field. The head office is situated in the heart part of Kathmandu Valley, Lainchaur. The board of directors consists of 8 members of whom two board members are from Ministry of Agriculture Development (MoAD). The corporation is headed by an executive director who is responsible and accountable to the Board of Directors.

1.1.8.2 Collection Network

DDC has been collecting cow, buffalo and Chauri milk from various places. Milk is collected through the farmers owned milk producers cooperative societies (MPPCS). Its present network has spread from Panchathar in the East to Surkhet in the West. Milk is a perishable commodity within certain time; it should be transported to chilling as well as processing plant. So, the reliable milk transportation facility should

be available. DCC has faced the challenges of processing, costing and diversifying to increase its staff productivity as well. To maintain its goodwill among its consumers, it is highly sensitive to substitute the new machineries equipment, too. The corporation has expanded its activities of the milk schemes to meet the growing demand of processed milk and milk products. Table (1.6), shows the milk supply schemes developed by DDC, Nepal in many time periods.

Table-1.6 Name of the Supply Schemes Established by DDC

S.N	Name of Milk Supply Scheme	Established Date	Capacity Liters/Hour	Districts
1.	Milk Product Supply Scheme (MPSS)	1969		Kathmandu
2.	Kathmandu Milk Supply Scheme (KMSS)	1973	5000	Kathmandu
3.	Biratnagar Milk Supply Scheme (BMSS)	1973	2000	Biratnagar
4.	Hetauda Milk Supply Scheme (HMSS)	1975	3000	Makawanpur
5.	Lumbani Milk Supply Scheme (LMSS)	1989	2000	Rupandehi
6.	Nepalgunj Milk Supply Scheme (NMSS)	1989	1000	Banke
7.	Janakpur Milk Supply Scheme (JMSS)	2008	2000	Dhanusha
8.	Dhangadhi Milk Supply Scheme (DMSS)	2009	1000	Kailali

Source: Dairy Development Corporation, Government of Nepal, Annual Report, (2014/15).

DDC has been establishing the new collection networks to collect milk as the demand of milk and milk products is high in market, especially in urban areas. Table-1.1 shows the milk supplies schemes established by DDC. Some details about them can be described below;

Milk Product Supply Scheme (MPSS): this supply scheme has come to in operation since 16th July, 1969 as the corporation of dairy development in the heart of Kathmandu, Lainchaur. In the beginning, MPSS was known for cheese production and

selling project that since 1991 to 1996, this project was oriented for yak cheese only. Later, this cheese production and selling project is converted into Milk Product Supply Scheme in 2011 in the same place. At present MPSS has 9 selling distributors, 24 franchise, 10 departmental stores and 9 hotels where 16 typed of ice-cream in different flavoured, and other standard milk products has been supplying.

Kathmandu Milk Supply Scheme (KMSS): KMSS is established in 1973 with the equipment and advisory services provided by the New Zealand Government. This plant with a capacity of 5000 litres began operations in Balaju, the industrial region of Kathmandu since 1977. Only the raised plant capacity of Lainchaur Dairy could not meet the increased demand. This supply scheme supplies the DDC milk and milk products to the Kathmandu valley. Now this plant has the capacity of 15000 litres per hours. Major products are milk, cream ghee and DDC fresh milk. Since 2014, KMSS has started to produce pannier, too. There are 57 chilling centres, 1377 milk selling booths and 2 distributor's centres in KMSS. This milk project has 10 milk collect network including Kathmandu district. Similarly, for milk and milk products transportation, KMSS has 19 road milk tankers, 3 mini trucks, 8 light automobiles and 2 motorbikes.

Biratnagar Milk Supply Scheme (BMSS): Biratnagar Milk Supply Scheme was established in 1973 at Kanchanbari, Biratnagar, in eastern development region of Nepal by the assistance of government of Netherlands. After the establishment of BMSS, the milk producers of 9 districts of eastern Nepal have got a regular market and the consumer of urban areas. This project has the processing capacity of 2000 litre per hour. More than 25000 farmers are engaged to producing milk. BMSS has 142 milk producing cooperatives, 5 distributors, 10 franchise shops and 2 own shops for selling milk and milk products.

DDC has established the skimmed milk powder plant with the assistance of Danish government in 2004 belonging to BMSS. This skimmed milk powder plant having the capacity of 3.5 metric ton daily, is useful to collect the over milk from farmer in lean season and make the powder which later is useful for flush season. Actually this plant removed the problem of Milk Holiday so as to make the powder from surplus milk. There are altogether 18 vehicles in BMSS to collect the milk and milk products.

Hetauda Milk Supply Scheme (HMSS): with the assistance of Danish government, in 1975, the HMSS was established in the mid Tarai region of Nepal. This project also covered the 9 districts and the consumers of Hetauda, Birangung, Narayanghad city directly facilitated to consuming the DDC milk and milk products in their local markets. On the producer side, more than 20000 farmers are selling milk daily in 9 chilling centres. This project has modernized plant having the milk processing capacity of 3000 litres per hours. There are 160 milk producer cooperatives, 15 vehicles, 21 dealers, 3 distributors and 210 milk selling booths are running in HMSS. The surplus milk also has delivered to BMSS and KMSS from HMSS.

Lumbani Milk Supply Scheme (LMSS): for the first attempt with the investment of DDC, itself has established the four milk supply schemes. Among them, the LMSS one has established in the year 1990, covering the Butwal industrial region. This project has the collecting capacity of 20000 litres milk on an average. Major products are: standard milk, curd, pannier and rosary. This scheme has sent the over collected milk to KMSS, Balaju.

Nepaljung Milk Supply Scheme (NMSS): in the course of expanding the milk collecting network DDC has established NMSS at Kohalpur, Banke districts in 1990. Initially, this scheme was operated in the name of Madhya-Paschimanchal Dugdha Bitaran Aayojana. Later this name has converted into NMSS, which has the processing capacity of 1000 per hour litres and the storage capacity is 10000 litres. NMSS is collecting milk from four chilling centres through five different means of transportation.

Janakpur Milk Supply Scheme (JMSS): At Dhalkebar of Dhanusha district JMSS established in 2008 with the investment of DDC, itself. Especially, this scheme is yoghurt-based since it is operated in the Tarai districts from where the consumers feel very hot in summer season. This supply scheme of DDC covers the five districts as Dhunusha, Mahottari, Siraha, Sindhuli and Udayapur. The yoghurt is produced minimum 1500-10000 litres daily. The processing capacity of the JMSS is 2000 litres and storage capacity is 30000 litres per hours. There are seven selling distributors system and four means of transportation in JMSS.

Dhangadhi Milk Supply Scheme (DMSS): This milk supply programme is also established with the investment of DDC, itself in 2009 towards the Far-Western Development Region of Nepal. This scheme is situated at Attariya, Kailali districts. It has

1000 liters processing capacity plant per hour. DMSS has expanded its selling and distribution region to Dhangadhi, Mahendranagar and Attariya. There are 142 booths, two CC of DDC and six CC of MPPCs. This project is operating in the building of agriculture cooperative and DDC pays the faire.

All these Milk Supply Schemes have the responsibility to collect the raw milk and processed it too. When DDC started its operation it had only Kathmandu Milk Supply Scheme (KMSS) and one Cheese Production and Supply Scheme with four Cheese Production Centres. Over the years, DDC gradually extended its activity area outside Kathmandu Valley, and established various milk supply schemes in different parts of the country to meet the growing demand for processed milk and milk products. DDC is planning to expand the collecting network to the highly demanded and potential area very recently. In 1980, with the assistance of Danish government DDC had established a milk supply scheme in the Pokhara industrial region, too. But this supply scheme has been privatized in 2004 in accordance to the government policy of privatization. Still, it is in operating in the name of Sujal Dairy Foods Private Limited.

These milk supply schemes developed by DDC has established in different time period in different places of Nepal with the grand assistance of many donor countries. By the end of 2003, the dairy development sector of Nepal had got the economic and technical assistance from many donor countries. At first, the New Zealand government and Switzerland government helped to the dairy sector of Nepal by providing economic as well as technical assistance. With the help of these two countries the first cheese factory had established in Ramechhap district. Similarly, in 1962 the next cheese factories were established in Solukhumbhu, Dolakha and Rasuwa districts of Nepal.

1.1.8.3 Major Donors Countries and Organisations to DDC

At establishment the DDC had fixed capacity of Rs. 1.65 million. Rapid expansion of DDC's infrastructural and processing capacity led to installing new machinery and equipment. Grand aid and long-term loans from bilateral and multilateral agencies were the main sources of investment. Major donors are the United Nations' World Food Program (WFP), New Zealand, Netherlands, Denmark and Aisan Development Bank (ADB). The DDC has long –term loans from Denmark, ADB, and World Bank.

The DDC took loans to expand chilling centres and processing facilities by importing machinery and equipment.

Food and Agricultural Organization (FAO) is the first donor organization of New Zealand government to invest to Nepalese dairy sector development. After the Rana's Regime in Nepal in 1951 A.D (2007 B.S), the FAO refers to start the Swiss Alpine Type of Hard Cheese in the high Himalayan region (3800m) height place named Langtang of Rasuwa district in the leadership of Mr. Tony Hagen. Later as he referred FAO has send the cheese expert Mr. W. Schulthess to Nepal for surveying the appropriate place to establishing the dairy plant in Nepal. As a result the team of Mr. Schulthess has found the right place to produce the cheese factory in Nepal and established the first dairy cheese plant in the Langtang of Rasuwa districts in 1953 A.D (2009 B.S.). With the establishment of Langtang cheese plant the modern dairy of Nepal has started since that period. The FAO has provided the economic as well as the technical assistance continuously till the date. After that, a dairy plant was established in 1956 with New Zealand assistance. This plant could process 500 litres of milk per hour. Hence the FAO is the major donor organization of dairy sector development of Nepal.

Denmark has ranked the most donor provided countries in the dairy sector of Nepal. Till now 153.6 million Danish crooners has received in different stages for the establishment of milk plant and projects. Hence the donor countries and the organizations have provided the machinery equipment, grand aid and technical assistance to flourish the dairy industries in Nepal.

Before the restoration of democracy in 1990 A.D. (B.S.), there were no private dairies industries and DDC solely had selling and distributing the milk and milk product. With the restoration of democracy, National Dairy Development Board (NDDDB) established in 1995. Thereafter, around 1950s other private dairies such as Chitwan Milks Pvt., and Sujal Dairy industry were established and the dairy transaction of DDC declined. Now it is estimated that about 40 percent markets share has occupied by DDC and the remaining 60 percent by private dairies (DDC Smarika, 2014). Nowadays most of the dairy industries are in closing situation due to lack of collecting raw milk from rural areas. Youth manpower is going foreign countries for working and their family are transforming to city.

1.1.8.4 Cheese Production Centers/ Factories

DDC has also performed its activities in cheese production and supply scheme. At first the Lainchaur milk product distribution project was considered and conducted by the production and selling centre of yak cheese products. Later this project converted into Milk Product Supply Scheme (MPSS) since 2010. In 1961, with the assistance of Swiss government the first cheese production and training centre was established. There are 16 cheese production centres in Mountain region.

Nepal is highly potential to produce the yak cheese. Keeping these things in mind DDC has also established the yak cheese production centres to the high Himalayan districts. There are 8 yak cheese production centres under DDC, shown in Table-1.7.

Table 1.7: Name of Yak Cheese Production Centres Established by DDC

Name of yak cheese centres	Districts Situated
Langtang	Rasuwa
Gosaikunda	Rasuwa
Gatlang	Rasuwa
Dgunche Pangalin	Rasuwa
Chordung	Dolakha
Chankhu	Dolakh
Thodung	Ramechhap
Pike	Solukhumbhu

Source: Dairy Development Corporation, Smarika, (2015).

Similarly, DDC had established Kanchan cheese production centres in Illam and Panchthar district of eastern Nepal. Now there are six Kanchan cheese production centre are operating in eastern Nepal. DDC has given the attention to develop the pannier and mozzarella centres. Currently, there are four factories of such kinds in Kavre and Nuwakot districts.

After the restoration of democracy in 1990 A.D. (2046 B.S.), Nepal government followed the policy of liberalization and privatization. This means foreign direct investment as well as private sector were encouraged to invest in different sectors of economy. This led the country not only towards the industrialization but also competition. As a result, in dairy sector private sector also entered in the market. In Nepal, prior to

the existence of DDC, milk and milk products (like curd, ghee, butter) were supplied primarily through individual, casual farmer and through private suppliers which were subject to irregularities, unhygienic and erratic price fluctuation, too. But after the establishment of DDC, milk and milk products have been supplied with hygienic way at affordable price. Milk is a rich source of minerals such as calcium, vitamin D and phosphorous which are very important to development human bones, but a glass of milk contains more other essential nutrients. Keeping these things in mind DDC has performing its activities in the production of hygienic and standardized milk and milk products.

1.2 Statement of the Problem

Nepal has great opportunities for increasing dairy livestock production and productivity. The demand of milk and milk products have been in increasing trend with the increasing urbanization that Nepal itself, is in the transforming process from a unitary system to a federal democratic structure. This means demand of milk is increasing especially in urban Nepal along with the rapid population growth. Milk is a perishable commodity and it is difficult to be marketed individually and this leads to creation of Milk Producers Cooperatives (MPCs). MPCs are considered as one of the major actors in the dairy sector of Nepal which have a strong channel between the rural milk producers and the milk processing industries. The main function of these MPCs is to collect milk from the farmers, test it for quality, transport it for selling to the nearest milk chilling centers or milk processing plant of DDC or for private dairies and receive payment for the milk from them. Thereafter, distribute the payment to the individual milk supplier farmers. Presently, the dairy cooperatives in Nepal are playing a limited role of collection and selling of raw milk to either DDC or private dairies. DDC is the leading agency of fixing the price of milk and milk products, collects milk from rural areas, processes milk and milk products and sales them to urban consumers. However, it is facing the problem of shortage of good quality raw milk. So, as to meet the increasing demand for milk and milk products, DDC has expanded its milk collection networks. DDC has accommodated this trend by providing special products for special needs; cheese, butter, yogurt, milk powder etc. This study tries to analyze the issues regarding demand and supply trend of DDC products, usefulness and performance of this public dairy sector and also the pricing policy of milk and milk products of DDC.

Today DDC is the symbol of many things like of the high quality milk and milk products sold at reasonable prices, of genesis of a vast cooperative network from Panchathar in the East to Surkhet in the West of Nepal. DDC has been providing various products in the market which are shown in table 1.8.

Table 1.8: DDC Products Available in the Market

S.N	Name of the Products
1.	Pasteurized milk
2.	Curd/yoghurt (Dahi in Nepali)
3.	Ghee
4.	Sweet items
5.	Cheese
6.	Pannier
7.	Butter
8.	Ice-cream
9.	Skim-milk powder
11.	DDC Fresh milk (bottle)
12.	Cream

Source: Dairy Development Corporation, Government of Nepal, Annual Report (2015).

These products of DDC are popular and preferable among the consumers. In terms of brand, consumers preferred milk from the DDC and from farmers. Consumer preference for the brands from the private sector was much lower (Joshi & K.C., 1998). However product diversification is the major option for increasing the quality and demand of DDC products. Nepalese dairy industry can be very much benefited through product diversification in terms of improving the overall operational profit by utilizing additional milk, and substituting imported dairy products. On the other hand, after entering into World Trade Organization (WTO) and South Asian Free Trade Agreement (SAFTA), the Nepalese dairy industry will be more exposed to the international market and the likely scenario is that other countries can produce high quality milk with lower costs (FAO, 2010). Thus, DDC has facing the strong challenges not only the domestic private dairy products but also the imported dairy products, too.

In current situation private dairies are rapidly established their own chilling and processing plants for collecting milk.

Therefore, this study has been undertaken to examine the present collecting, producing and marketing as well as the financial performance of DDC and analyzes the trend of its demand and supply of DDC products. The price trend of DDC product has also been undertaken. Thus, the study has sought the following problems as;

1. Whether the performance of DDC is satisfied or not as public enterprise?
2. What is the price trend of DDC product?
3. What kind of problems is facing the DDC at present and what will be the appropriate measures to solve these problems?

1.3 Objectives of the Study

The overall objective of the study is to examine the performance of Dairy Development Corporation (DDC), Nepal.

The specific objectives are as follows;

4. To examine the performance of DDC.
5. To analyze the price trend of DDC product.
6. To identify the current problems and suggest appropriate measures to overcome them.

1.4 Significance of the Study

Dairy today is the basis of a multi-billion dollar industry worldwide. India has become the top most country of producing dairying. The production of milk which is also made into cheese, butter, yoghurt, etc., and other dairy products provides an important part of food supply for many of the world's people, which has huge demand in the market.

Agriculture is the main source of livelihood for the rural population of Nepal. Amongst the various sectors of socio-economic importance, dairy industry deserves the high priority sector in Nepalese economy as it plays an important role in the economic upliftment of the weaker section of society engaged in cattle rearing and processing of milk and its products. The Nepalese dairy sectors are the major contributors to the agriculture Gross Domestic Products (GDP) in term of output milk is now the single largest commodity. As per conservative estimate around 46 percent of milk is consumed in form of liquid milk, 48 percent as traditional dairy products and 4 per-

cent as western dairy products. The dairy industry in Nepal is currently estimated to be about 1.35 million metric tons and is expected to grow at 4-5 percent per annum (Yadav, 2016).

DDC is a fully state owned corporation, initiated for the economic advancement of the poor farming communities, and has flourished into a nationwide movement with an annual collection over 60 million litres of milk from rural area of Nepal. With the state of art infrastructure comprising of fully modern plants, 16 cheese manufacturing units, and 65 milk chilling plants and highly qualified dairy specialists, DDC is a precious asset in the economic development of our nation. The dairy sector is predominantly through the smallholder production system and DDC has promoted this system where more than 200 thousands farmers are involved in milk production-milk producer cooperatives.

This study will try to show the economic performance of DDC at recent time and increasing demand and supply trend of DDC consumers, variation of its prices to basic to special goods and the conclusions will be expected to be useful to the concerned authorities, policy makers, and individuals to understand the real situation of price trend, demand for and supply of milk and milk product of DDC. This study may also be helpful for the study of economic condition of the study area. This study is expected to work as guidelines for further research works in the field of dairy development of Nepal and related agency. Therefore, this study will have great significance from theoretical as well as practical perspectives. This study deserves key significance since it is a new attempt for the study area.

1.5 Limitation of the Study

Though research work is carefully designed to get the most reliable results, the findings of the study may not be generalised at the national level because of small sample size. There are some limitations of the study.

1. This study focuses only one DDC of Nepal. Therefore the findings of the study may be applicable to others.
2. The study is based mostly on secondary information and the reliability of the results depends upon the validity of secondary data.
3. The research is Master's degree thesis for academic purpose and it is obviously limited in terms of time and the budget.

4. Simple statistical tools have been used to analyze the data obtained from different sources. Data have used by secondary sources, so it is the one of the main limitations of the study.
5. The study covers the data of 2005/06 to 2014/15 due to inconsistency of data availability.

1.6 Organization of the Study

This study is derived into six chapters. The *first chapter* deals with the *introduction*. It includes the background of the study where the world dairy sector outlook as well as the brief overview of Nepalese dairy sector has been described along with the scenario of SAARC member countries. This chapter also includes statement of the problem, objective of the study, significance of the study, limitations of the study and organization of the study. *Chapter two* covers the literature review: at international context and national context. In both contexts of literature review related reports, journals, thesis works and books are reviewed. *The third chapter* deals with the methodology of the study. As the overall objective of the study is to examine the performance of DDC the descriptive and explanatory research design has been used. Since this study is based the DDC's past events it is based on historical in nature. *The fourth* chapter discusses about the performance of DDC where milk production, collection and marketing performance has been analyzed. The price trend of DDC products during this study period has been dealing in *fifth* chapter. The demand and supply trends of DDC product and its current price trend also include in this chapter. *The six chapter* deals with findings, conclusions and appropriate recommendations for the DDC and concerned agencies and authorities.

CHAPTER- II

LITERATURE REVIEW

The purpose of this chapter is to review theoretical foundation and studies made on the aspects of dairy sector. The chapter deals with theoretical as well as empirical inputs based on relevant books and published and unpublished reports. Under this heading, we discuss the past history, efforts made by government, and other published or unpublished reports, studies as in the national and international context.

2.1 International Context

Billions of people around the world consume milk and milk products every day. Not only are milk and dairy products a vital source of nutrition for these people, they also present livelihoods opportunities for farmers, processors, shopkeepers, and other stakeholders in the dairy value chain (FAO, 2013). There are various studies have been made on the dairy and its products internationally. Some studies have been stated the role of dairying in supporting livelihoods to the poor farmers, and some others have stated the nutritional aspects of dairy for all human beings worldwide. So, here only related research works like reports, journals, research paper and other publication which has concerned for the present study are reviewed in the following:

Wambugu et.al (2011) has examined trends in milk productivity and performance of the Kenyan smallholder dairy sector using a nationwide representative panel household data and cross-sectional data in the major milk producing areas. Descriptive statistics and gross margin analysis of the dairy enterprises were used to examine the performance of the dairy sector between zero and non-zero grazing system and, across different milk sheds. The findings of the study have showed a positive trend in milk productivity between 2000 and 2010. Gross margin analysis has showed that dairying is an economically viable enterprise in the short-run, with the non-zero grazing system having higher gross margins and therefore, a financial advantage. Hence, greater commercialization, improved technologies and investment in processing of long life dairy products and in infrastructure like roads and electricity should take in consideration for the better performance of dairy enterprise in Kenya as they suggested.

Gerosa, S. & Skoet, J. in the ESA Working paper (2012) has reviewed the trends in global production and consumption of dairy products as well as the drivers behind

increasing production and consumption of dairy products between developed and developing countries. This paper has shown the reason of rapid growth in consumption of dairy products in developing world is driven by economic growth and rising income levels. However, large differences in levels of per caput consumption among developing country regions and countries persist. Increasing consumption in developing countries has been accompanied by a major expansion of production in several developing countries, significantly outpacing production growth in the developed country group. Another reason to growing demand and production growth of dairy worldwide is driven by the technological change in this sector, which has permitted major increases in productivity and the emergence of large-scale commercial dairy farms. But in several developing countries, the small-scale of dairy producers have used these technological equipments. Technological development expands the trade of dairy sector internationally by facilitating product movements.

Finally, this paper concludes the fact that the rapid expansion and transformation of the global dairy sector, in a setting of weak institutions and governance have given rise to risks with potentially large negative implications for livelihoods, human and animal health and the environment. This also recommendates as in order to meet the challenges and constraints of dairy sector, it requires renewed attention and investments from the agricultural research and development community and robust institutional and governance mechanisms. If these issues are addressing, the contribution of dairy sector to human welfare will be high in future.

The IDF Fact Sheet (2013) has stated that dairy is a universal agricultural production: people milk dairy animals in almost every country across the world, and up to one billion people live on dairy farms. It is the vital part of the global food system and it plays a key role in the sustainability of rural areas in particular. Further, the Fact Sheet has been highlighted the economic importance of dairy as it has been placed as a universal agricultural production and a dynamic global industry, with steadily growing production trends (+2.2 percent annually on average since 2000) which are forecast to continue in the long-term. Dairy industry also actively contributes to the economies of a number of communities, regions and countries of employment generation, trade and above all income.

Deshmukh (2014) has pointed that the co-operative sector in India has emerged as one of the largest in the world and is playing an important role in the socio-economic de-

velopment of millions of Indian rural families. The research paper was descriptive and based on secondary data. The major findings are: India has emerged as world's largest producer of milk which contributes more than 16 percent of the world's total milk production. The investment, innovation, energy and application of scientific production techniques by small, medium and large farmers are the key agents that India becoming the major player in the world of dairy sector. The dairy sector of India has in increasing trend in terms of share in agricultural GDP. Though India has become the largest milk producing country in the world, its position in terms of per capita availability is one of the lowest. Uttar Pradesh is the largest milk producing state in India, producing about 22.5 millions tones of milk solely.

Pandey (2014) has tried to analyze the dairy development production, marketing in east Sikkim. Some of the concluding points made by the researcher are: The Indian dairy sector has characterized by small scale, scattered and unorganized milk animal holders. There is inadequate and inappropriate animal feeding and health care and the dairy sector has not been developed much in the tiny Himalayan state, Sikkim. Milk production in Sikkim has in fluctuating trend with the comparison of other states of India; their milk production is increasing as time has changed where as Sikkim's milk production shows declining trend. Though from 1980 till 2012, there has been an increase in the number of producer members and organized cooperative societies under Sikkim milk union and though the growth rate of dairy incomes has been registered at 17.6 percent per annum from 2004-05 till 2011-12 but on an average, the percent share of dairy income of Sikkim Milk Union in GSDP of Sikkim is only 0.24, which is very discouraging and shows less contributing sector in Sikkim economy. Similarly, the average number of cattle between member and non member household is quite different and the member household holding of both cross and local breed was higher as compared with non-member household. But the discouraging fact is, there is on an average 0.86 cross breed cattle holding by member and 0.76 by non member household. The holding of local breed cattle was higher for both member as well as non member household with an average of 2.14 and 1.56 respectively.

Mean milk yield per day by cross breed was higher as compared to local breed cattle in the study area. It has also been observed that landless farmers have higher production and sale of milk per day than other participants. Socio-economic profile of sampled dairy household between co-operative household and non co-operative house-

hold has showed the different. Similarly other variables like age, number of local milking cows, number of crossed breed cow, sex and education were found to be statistically insignificant. Finally, the researcher concludes that the contribution of dairy sector in east Sikkim is very less and the sector is in very infancy stage as compared to the co-operative member household to non- co-operative member household.

Reddy & Ramappa (2016) have observed that Most of the farmers in India depend on agriculture and allied activities. The dairying has been playing a major role by providing livelihoods to the rural people. The objectives of the study are: to know the growth in the bovine population in India, analyse the trends in milk production and per capita availability of milk and analyse the share of livestock production in GDP. The study reveals that the percentage share of cows declined and that of buffaloes significantly increased. It is due to high price for buffalo milk. It is observed that the percentage of CB cattle in total cattle increased and that of indigenous cattle population declined. The per capita availability of milk increased from 130 grams per day in 1950 to 299 grams in 2012. The share of livestock sector in agriculture GDP also increased from 13.88% in 1980-81 to 29.20% in 2012-13. Among the top ten countries in the world India is in 2nd position in cow milk production. It is also evident that among the top ten countries India is in 1st position in buffalo milk production. It is observed that the milk yield per head is low in India. Hence there is need to raise the milk yield in order to enhance the per capita availability of milk and to meet the increasing demand. Measures must also be taken to protect the cattle and to increase their number. Despite India being the largest milk producer in the world, its yield continues to remain low at 1.1 tons per head during 2010-12. USA has the world's highest milk yield with 9.7 tons per head followed by European Union (6.6 tons per head) during the same period.

USDA (2017) has provided a profile of India's dairy sector using available secondary data and research to examine trends in supply, demand, and trade and factors affecting these trends. This report has attempted to identify the growth prospects for India's dairy production and trade, accounting for the structural, technical, and policy factors likely to shape that growth. As this report has addressed, India is the world's largest producer and consumer of milk and has the world's largest dairy herd, comprised of water buffalo and indigenous and crossbred cattle. Annual growth in milk production and consumption has been a robust 4.2 percent since 2000, and India has also

emerged as a small net exporter of dairy products. Water buffalo and crossbred cattle account for all of the growth in the dairy herd and milk production, but average milk yields remain well below both international standards and those achieved under domestic best practices. Further, this report has stated that India's dairy cooperatives have played a key role in expanding milk and milk product marketing, and private-dairy sector processors may play an increasingly important role in catalyzing more production of both milk and milk products.

2.2 National Context

A number of research studies have been done nationally on the dairy and its products in national levels too. Some of are as follows:

Chapagain (1978) has evaluated the performance of DDC as a public enterprise and that the profit maximization is nil. The main objectives are: (a) to find out the main problem of DDC and (b) to study the marketing outlets of DDC.

In order to analyze these objectives this research report concerns with milk collection, production and distribution, and other by- product, too. The report has tried to shoe the actual condition of DDC that it has mentioned the sales figures and financial position of DDC. Similarly, to show the profit and losses figures, two years data had taken as 2027/28 and 031/32.

Lastly, he has mentioned the major findings, solution and concluding remarks. The study indicates the major findings as (a) DDC's profit is nil because of the poor management. (b) Milk and dairy products do not met the supply satisfactory especially in Kathmandu valley. (c) The corporation does not have well defined plans and programs. (d) The corporation does not have a particular price policy. (e) The corporation does not have more collecting centers and there is no proper utilization of available resources. So, valuable currencies outflow from the country.

In short, his findings were the DDC has not been able to meet the supply, its profit is nil because of the poor management of the whole organization. The writer has also recommended that the DDC staff should give to select to DDC itself. Further he has suggested that the DDC should welcome the healthy criticisms from the public and try to improve them sincerely.

Jha (2006) has examined the profitability condition of DDC as a public enterprise on the basis of sales and production. Some major findings of this study are: (a) DDC is

suffering from the loss and loss is in increasing trend with sales. (b) Due to high amount of accumulated loss, the shareholders funds of DDC showed very less value. (c) The fluctuating trend of financial structure shows that DDC has been facing problems of financial structure. (d) DDC prepared its financial statement in the traditional basis. The researcher has drawn some conclusions based on his research as DDC has concentrated its whole efforts on the survival of the corporation and has no depth analysis of its strength and weakness. There is no proper management to supply the sufficient milk in the urban areas because of the difficulty in collecting surplus milk in rural areas and DDC has no fair system of rewards and punishment to its employees on the basis of their performance is maintained. Lack of budgeting expert and skilled planner, plans are formulated on traditional basis. The main problem of DDC is materials and markets which are not available in right time in right quantity and right places so as to supply for production.

Acharya & Basnet (2009) have examined the supply chain challenges faced by the DDC in the perspective of buyer-seller relationship based on five different models. This thesis has focused the study on Eastern Development Region of Nepal, covered by a unit of DDC, Biratnagar Milk Supply Scheme (BMSS).

Major findings are as (a) There is no more entry barrier in buyer side that is why new players has entered in this market but there is no vulnerable competition between the BMSS and private diary firms. (b) Powder milk is imported by the consent of government and there is volume restriction as well, so it doesn't seem threats to both buyer and supplier. (c) Bargaining power of MPCs has been increased and switching cost of supplier has been decrease due to the entry of private diary firms in the market. (d) BMSS is still in a position of structural dominance over its extended networks of suppliers because of fragmented sources of suppliers.

Thus, this thesis has explored the problem in managing buyer seller relationship in dairy business in Nepal.

FAO (2010) has studied the overall dairy sector of Nepal where the dairy related institutions like DDC, NDDDB, NCDB etc. and other private sector have introduced. Similarly, the role review of dairy related institutions has been explained properly.

Some of the major findings of this study are as (a) The MPCs is considered as major actors of producing milk in dairy sector of Nepal is found to be operating in a condi-

tion of disarray because the less initiation to regular monitoring in the performance of MPCs from the dairy related institutions. (b) DDC is not engaged in executing in milk production programs by providing technical as well as the financial support to rural milk producers, its activities are limited to milk collection only. (c) Although the NDDB is mandated for overall dairy development activities, it has not been able to fulfill its mandate due to some major problems regarding composition of its Executive Committee, financial constraints and weak staff position. (d) The mandate given to NDDB also overlaps with the function of DLS. (e) The pricing of milk and milk products is characterized by conflicting Act and Policy; absence of an established pricing mechanism in terms of basis pricing and pricing intervals; and involvement of many actors, but without any clarity on their roles. (e) All the actors agree on production of good quality milk and milk products; they have not been able to play their role in improving the quality of raw milk as well finished products. (f) The pasteurized milk is not safe to drink directly from the packet it is because the problem of poor quality is intensified when the products are not processed using optimum parameters and post –processing handling is bad.

The FAO has pointed that Nepal has highly potential country for increasing dairy production if the availability resources are utilized systematically. However, there have been lots of constraints despite the opportunities.

Gurung (2010) has analyzed the financial performance of DDC by taking data of FY 2060/61 to 2064/65. Major objectives are: to analyze the profit or loss of DDC, to find out the financial trend of DDC. The major findings of this research study are as (a) The current liquidity ratio of DDC is able to meet the current obligation. (b) The profitability position of DDC is highly unsatisfactory and unfavorable like that of most of the PEs. (c) The debt equity ratio is quite satisfactory as compared to other ratios because of less debt than the equity. (d) DDC has high burden of management and administration expenses and interest on loan that influences the profit directly. (e) DDC has not the practice of using statistical tools in sales forecasting. Therefore this study has made some valuable suggestions to the DDC management team, its Board of Directors and other concerned authorities.

The GOEC (2012) has reported to NDDB that the per capita availability and consumption of milk and milk products in the country is far below the recommendation made by WHO/FAO (250 g/day). The study methodology has comprised basically of

two components namely desk study and field survey. Under desk study, through reviewing, critically analyzing and synthesizing the available information on national and international dairy sector were done. Reports of DDC and other private dairies and DMPCUs were extensively studied. Some of the major findings of this research report are as (a) Nepal is still not self sufficient in producing milk to meet the current demand and is annually importing dairy products worth 1 billion rupees from formal channels from around the world and uncounted amount from informal channels despite having high livestock population. (b) The rise in milk price was slow and steady during 1990s but abruptly started rising faster since 2007. (d) The share of processed milk marketing of DDC compared to other dairy sector has declined over year. (e) DDC is engaged in commercial activities of collecting milk from rural areas, processing it to milk and milk products and distributing them to urban consumers. (f) The main problem facing the DDC is the shortage of good quality raw milk whereas demand for its milk and milk products in the urban areas is increasing.

Finally, this thesis report has given the valuable suggestions to dairy related institution for involving marketing research for updating the regular database such that proper marketing strategies are developed through analyzing the trends in the markets.

The NEPC (2014) has studied the milk processing cost items in the dairy industries. This includes cost of raw milk, collection chilling and transportation cost of raw milk; processing and packing cost, sales and distribution cost and administrative overheads. The major objectives of this study are: (a) Assess the fixed (depreciation, insurance, interest, on equipment, building, land, infrastructure, fuels salaries, benefits, rent) and variable costs (raw milk, transportation road tanker, chemicals, consumable, distribution, and sales) for milk processing. (b) Assess the costs for chilling transportation up to the milk processing plant and distribution to the consumers; recommend appropriate price for processed milk

Both primary and secondary sources of data information have used to achieve these objects from concerned stakeholders. Major findings are: (a) Processing cost of locally collected raw milk in processing plant is high. (b) Processing plants have much higher administrative cost than other cost due to depreciation which is non-cash cost. (c) Seasonal variation in milk collection increases the per unit cost that is in lean season then in flush season. (d) The DDC brand products have dominated the local production in market share. (e) Product diversification of dairy product is not well devel-

oped (f) Passive role of dairy related institution to like DDC, NDDB, and NDA in overall quality improvement. The formal sector milk marketing has limited networks.

Inlogos (2015) has reported that to transfer of new cost effective technology to dairy farmers either by developing or importing could be breakthrough for dairy sector development of Nepal. This study has also used the both primary and secondary data information. This reported has pointed the some issued being faced by Nepalese formal dairy industries and related agencies as:

Nepal is importing considerable amount of milk and milk products from other countries. It means there is gap between production and consumption of milk and cost of milk is increasing. Despite the agreement signed in WTO framework, the Nepalese milk collection system is operating traditional methods and technology when it is very difficult to compete with the international milk market. Cost of feeding materials, labor, services, veterinary medicines, live animal, breeding technology and tools has been increased and sometimes not available when it is required. Marketing and pricing system of raw milk is not producer and consumer friendly nor are the processing industries feeling comfortable with tax, power supply and import, export policy.

Finally, this survey report has concluded that cost of milk production is very high due to attribution to different production variables. The feed cost is much higher followed by the interest of the capital, live animal, care and management, disease prevention and control, marketing and breeding.

RAN (2016) has submitted a benchmark survey report to NDDB which has concluded that the both pasteurized and loose milk are sold in Nepal on the basis of fat content or based both on fat and SNF content. The quality of pasteurized milk sold in the various brand names in Nepal mostly comply with the legal standard set forth by Nepal Food Act in terms of fat and SNF content. The fat content and SNF content did not vary significantly from the set standard of 3 and 8 percent respectively. The detectable adulteration in pasteurized milk was also minimal. The quality of milk sold in Kathmandu valley from the micro biological aspect was more critical and do not comply at all with the set forth standard of nil coli form count in pasteurized milk. The bacterial contamination was more in the milk sold loose compared to the pasteurized milk. Stringent hygienic measures both at production and processing unit thus is warranted.

Farmers need to be encouraged to comply with good husbandry practice and processing industry should strictly follow the code of practice developed for dairy sector.

2.3 Research Gap

All the study mentioned above have analyzed the dairy and its products in both national and international context. In Nepalese context, no specific researches have been available regarding the performance of DDC. Whatever the information is available it is based on the thesis work of students of commerce and business faculty regarding the topic that financial performance of DDC only. They have analyzed the DDC on the basis of its past records. These studies have focused on the financial performance, milk collection, marketing and distribution of DDC only. So there is research gap on the performance of DDC, Nepal. Hence, to fill up the gap the present study is being carried out.

CHAPTER- III

RESEARCH METHODOLOGY

3.1 General Introduction

Research methodology is the way to solve systematically about research problem. “Research methodology refers to the various sequential steps to adopt by a research in studying a problem with certain objective in view” (Kothari, 2000: 39). In other words, research methodology describes the method and the process applied in the entire aspect of the study. It helps to analyze, examine and interpret various aspect of research work such as sales and production planning and other aspects related to profit planning in the research work. In accordance with the basic objectives and other sub- objectives are also formulated and research methodology is followed to achieve the objectives of the research paper. Hence, Research methodology is the way of systematically solving the problem. It is a science of studying how research is conducted scientifically. It comprises of tools and techniques used to analyze the data as well as logic behind the research work. Thus, this chapter includes types of research design, nature and sources of data, process of data collection, and statistical tool used during data analysis. The major contents of research methodology followed in the study are as below.

3.2 Research Design

“A Research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure” (Kothari, 2000: 39). In other words make any type of research a well-set research design is necessary, which fulfils the objective of the study. Generally research design means definition procedure and technique, which guide to study and propounds way for research through analysis of data. This study is an examination and evaluation of overall performance of DDC

Research design provides the overall framework for the activities to be undertaken during the research study. This study is based on both descriptive and explanatory research design because it tells the past activities of DDC since 2005/06 to 2014/15 in descriptive way. The analysis is made on the basis of past so the research is historical in nature. The accumulated data is presented, tabulated and described systematically

under specific heading so as to meet the objective of the study. Hence, the research design is plan to obtain the answer of research question through analysis of data. Thus, analytical as well as descriptive approach has been adopted in this study.

3.3 Nature and Sources of Data

To fulfill the objective of this study, mostly secondary data are used. Informally, some information is also collected through the informal talk with the employees of DDC and its officials. Secondary information is based on research reports, relevant books, articles, and other published materials from the NDDB and DDC. Some information are taken from the MoF, MoAD, MoLD, and DLS reports, Webpage surfing. Basically quantitative data are collected by using various methods and presents as per need of the study. In order to analyze the data, simple statistical tools like table, frequency, percentage, average weighted average will be used. Likewise, Microsoft word and Microsoft excel are used as to analyze the data.

3.4 Data Presentation, Analysis, and Interpretation

Basically, quantitative data collected by using various methods is categorized and presented as per the need of the study. In order to analyze the data, simple statistical tools such as frequency, percentage, average weighted analysis are used. Interpretations are made on the basis of result, which assist by qualitative as well as quantitative data and information obtained from both primary and secondary sources.

This study examines the performance of DDC since 2004/05 to 2014/15. It includes the production, collection and marketing performance of the organization. Moreover it includes the financial performance of the DDC. To assess the dairy sector's competitiveness, a performance analysis looked at five factors:

- Demand condition
- Market structure
- Factor conditions
- Related supporting industries and government, and
- The enabling environment.

3.4.1 Demand Condition

Milk and milk products in Nepal is likely to grow significantly in the coming years, driven by more consumers, higher incomes and greater interest in nutrition. Level of per caput consumption of milk and milk products are determined by a number of fac-

tors, including economic ones such as income levels and relative prices, demographic factors such as urbanization, as well as social and cultural factors (GOEC-NDDDB, 2012). Consumption of processed and packed dairy products is increasing in urban areas whereas in many parts of the country, people still prefer unpacked and unprocessed milk delivered by local milkman because of its taste and perception of freshness. But in urban areas, due to the competition from private dairies, several national and international brands have entered in the market and expanded consumers' expectation of quality.

In Nepal, population is increasingly becoming urbanized. The rural people who used to be the milk producers some years ago have now become the urban consumers. Urbanization has brought increased disposable income and consumption of higher cost foods, such as milk and milk products (WTO, 2010). Therefore, the demand for dairy products is increased in day by day. It has been reported that income elasticity for dairy products in developing world is 0.8 meaning that for every 1.0% increases in income, demand for dairy products increase by 0.8% (Gerosa and Skoet, 2012).

3.4.2 Market Structure

Until the year 2004, traditionally, cooperatives were the dominant players in the formal sector. But after the liberalization of the dairy industry in 2004, the private dairies have increased quite significantly in the market and the private investment has increased (DDC Smarika, 2015). The larger proportion of the milk and milk products are sold through informal channel and the share of milk and milk procurement are very low. Similarly the imported dairy products also entered into the Nepalese market. Thus, the market share of DDC products including processed milk decreased. Now the market share of processed milk by DDC is 40 per cent and the remaining 60 per cent is of informal channels (NDDDB, 2015).

3.4.3 Factor Condition

Factor condition of dairying entails the quality of animals, human resources and technical skills, land availability, capital, credit, infrastructure and other inputs relevant to the value chain. These factors are very critical in determining the milk productivity and overall production, collection and marketing. The DDC as a government entity, has planned these all but not in effectively and appropriately. Low productivity of milk and milk products is the cause of traditional feeding practices not based on scien-

tific feeding and producing method, and limited availability and affordability of quality feed and fodder. Scarcity of animal fodder resource, animal health and breeding services provision, credit for the expansion of the herd to farmers through government subsidy are responsible for the factors conditions. The DDC has operated some programs such as *GAIMAI* in the village areas but not successes. The milk plants are in critical position and there need maintenance or transformation totally. Similarly human manpower and modern technology enhances the milk productivity.

3.4.4 Related Supporting Industries and the Government

NDDDB is an apex autonomous institution and the policy body for holistic dairy sector. It was established in 1992, to strength the dairy sector in Nepal through policy formulation and recommendation. Some of its functions including acting as a coordinating body between the private and public sector, formulating and recommending price fixing policies of milk to government of Nepal (GoN), monitoring and evaluating dairy development programs and mobilizing funds for dairy sector development (NDDDB, 2015). Government of Nepal has policy to support and encourage farmers through subsidies, affordable and accessible veterinary service, cattle insurance, easy loan with lower interest rate, improved cattle supply etc but it is not enough. These activities are in a certain way being provided by the MPCs, DDC and private players. However it is limited and accessible only to few producers.

3.5 Financial Tool

Financial statements are prepared not as end in themselves, but to assist users to make decisions. The commonly used means of conducting financial analysis is ratio analysis. Ratio simply expresses a quantitative relationship between two figures. In general, it is a statistical yardstick through which the relationship between two figures can be compared and measured. Ratios measure a firm's crucial relationships by relating its inputs (costs) with outputs (benefits) and facilitate comparisons of these relationships over time and across firms.

Ratio analysis may be done for variety of purposes, which ranges from a simple analysis of the short- term liquidity position of the firm to a comprehensive assessment of the strengths and weakness of the firm in various areas. In other words ratio analysis helps the analyzer to make quantitative judgment on the firm's financial position as

well as performance. It presents the actual situation of an organization and provides guidelines especially in spotting trend towards better or poor performance.

3.5.1 Financial Ratios

Financial ratios are the tools for studying the financial health of the concerned organization. Financial ratios are the most common and widespread tools used to analyze a business' financial standing. Ratios are easy to understand and simple to compute. They can also be used to compare different companies in different industries. Since a ratio is simply a mathematical comparison based on proportions, big and small companies can be use ratios to compare their financial information. In a sense, financial ratios don't take into consideration the size of a company or the industry. Ratios are just a raw computation of financial position and performance. Here the some important ratio of DDC can be analyzed.

3.5.1.1 Current Ratio

The current ratio provides investors insight as to whether a company has the ability to generate enough cash to pay off all debts should they become due simultaneously. The current ratio can be calculated as:

$$\text{Current ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

The higher the ratio, the more current assets a company has at its disposal to pay off its obligations. While acceptable ratios vary depending on the specific industry, a ratio between 1.5 and 3 is generally considered healthy.

3.5.1.2 Quick Ratio

The quick ratio is a liquidity ratio that is more stringent than the current ratio. This ratio compares the cash, short-term marketable securities and accounts receivable to current liabilities. The thought behind the quick ratio is that certain line items, such as prepaid expenses, have already been paid out for future use and cannot be quickly and easily converted back to cash for liquidity purposes.

The quick ratio can be calculated as:

$$\text{Quick ratio} = \frac{\text{Quick Assets}}{\text{Current Liabilities}}$$

3.5.1.3 Debt- Equity Ratio (D/E Ratio)

The debt-equity ratio is a measure of the relative claims of creditors and owners against firm's assets. It is calculated by dividing a firm's total liabilities by its shareholder's equity. A high debt-equity ratio is unfavorable because this introduces inflexibility in operations as a result of increasing interference from creditors. The D/E ratio can be calculated as:

$$\text{Debt - Equity ratio} = \frac{\text{Total Debt}}{\text{Shareholder's Equity}}$$

The higher ratio shows the large share of financing by the creditors as compared to that of owners. It indicates the margin of safety to the owners. The creditors prefer low debt/equity ratio as it implies larger safety margin for creditors.

3.5.1.4 Debt-Capital Ratio (D/C Ratio)

Debt-capital (D/C) ratio is the ratio of its total debt to its total capital, its debt and equity combined. The D/C ratio measures a company's capital structure, financial solvency, and degree of leverage, at a particular point in time. It is calculated by dividing the borrowing to total capital of a firm. This can be shown as:

$$\text{Debt to Total capital ratio} = \frac{\text{Long - term Debt}}{\text{Capital Employed}}$$

Here, capital employed means the total capital invested in the business. The total capital includes the shareholder's equity and long term debt. A low ratio is considered favorable for both shareholders and creditors as it indicates the lower claim of debt holders and provides security to creditors in exceeding credit. On the other hand, a high ratio represents greater risk to shareholders and to creditors.

3.5.1.5 Net Profit Margin

Net profit margin establishes the relationship between net profit and sales of firm and measures the firm's ability to turn each rupees sale into net profit. This ratio provides considerable insight into the overall efficiency of the business. Net profit is obtained after subtracting operating expenses, income tax, and interest from the gross profit. This ratio can be calculated as:

$$\text{Net profit Margin} = \frac{\text{NPAT}}{\text{Sales}} \times 100$$

Where, NPAT = Net Profit after Tax

Higher net profit ratio is preferable to the firm because it shows that the firm is able to earn more profit per rupee of sale. It is an indication of overall efficiency of the firm and better utilization of total resources.

CHAPTER-IV

PERFORMANCE OF DAIRY DEVELOPMENT CORPORATION IN NAPAL

4.1. Meaning of Performance

Performance is an assessment for an organization of its success in areas related to its assets, liabilities and overall market strength (B.D., 2015). Considering the expansion of the Dairy Development Corporation (DDC) over the 40 years in terms of physical infrastructure, manpower development and addition of employees, adoption of new technology it is necessary to evaluate its performance. Since the corporation is operating fully with government ownership, the economic condition is not satisfactorily. The corporation has recorded continuous losses in the past 3 decades and it has improved its condition year after year since the past decades. Due to the unhealthy competition of collecting row milk, there have been seen the problem of producing pasteurized milk.

4.2 Collection Performance

DDC has been collecting cow, buffalo and Chauri milk from 44 districts of Nepal. Milk is collected through the farmers owned milk producers cooperative society (MPCS). Its present milk collection network has spread from Panchthar in the East to Surkhet in the West.

4.2.1 Raw Milk Collection

The formal markets for collecting raw milk produced by farmers are dairy- the DDC, the private dairies and the farmers' co-operatives, either the MPCs or MPCUs. Informal market for selling milk to the urban consumers by the producer farmers directly or through tea shops also significant. The annual milk production in Central Development region was highest (29.7%) followed by eastern Development Region (25.5%), Mid-Western Development Region (11.6%), and least in Far- Western Development Region (10.1%) also coinciding with the milk collection network established in the country. Recently, milk collection and processing facilities have been established in the Far-Western Development Region.

Table 4.1: Annual Milk Production by Development Regions (2012-13)

Development Region	cow			Buffalo			Total Milk (MT)
	Milking Animal	Milk Production (MT)	productivity (kg/Year)	Milking Animal	Milk production (MT)	Productivity (kg/Year)	
Eastern	302,767	151,113	499.1	300,644	245,338	816.0	396,451
Central	238,973	120,941	506.1	347,604	341,970	983.8	462,911
Western	156,800	72,396	461.7	352,959	288,257	816.7	360,653
Mid-Western	147,788	53,021	358.8	151,443	126,997	838.6	180,018
Far-Western	127,794	49,714	389.0	138,994	106,763	768.1	156,477
Nepal (Total)	974,122	447,185	2214.7	1,291,644	1,109,325	858.8	1,556,510

Source: Nepal Dairy Development Board (NDDB), Final Report (2016).

The trend analysis of milk production from cow and buffalos shows gradual steady increase in both total production and number of milking animals, but the productivity improvement has been marginal both for cow and buffaloes. Programs for increasing the productivity of dairy animals rather than increasing the absolute number of animals would be quite essential to minimize additional burden on already limited availability of livestock feeding resources.

The flow of raw milk in the formal market for processing through cooperative or directly to industries from their chilling centers established at strategic location has been highest in central development region followed by eastern development region and western development region. All medium to large scale dairies both DDC and private dairies have been established in these regions. Milk flowing into formal market in mid western and far western regions are minimum, but has been recently getting momentum with establishment of DMSS at Attaria, Kailali by DDC.

Small dairy shops selling raw milk, curd, pannier, ghee etc are emerging rapidly in the cities and towns of the country. In the towns of mid and far western regions, farmers themselves have been found to be encouraged to establish such dairy shop to address the growing demand for milk and milk products in the town.

4.2.2 Channel of Milk Collection

Dairy industry is said to be a process from “Glass to Glass” which passes through different channels involving various actors (FAO, 2010). So the different channels play the role to collecting the raw milk. MPCS is the main actor to collect milk from

farmer to milk collection centers in both formal and informal milk trading. In DDC too, the MPCs collect raw milk from rural farmers to milk collection networks day by day. The key actors in the DDC dairy value system include milk producer farmers, MPCs, MCCs and milk processing plants/cheese factories. Firstly, there are rural farmers and their function is to be engaged in milk production. The next are MPCs established in the rural areas. Farmers from the surrounding villages carry milk to the nearest MPC where their milk is received, measured, recorded and samples are also taken for quality check. It is then vehicles pick up milk from collection centers and transport it to the nearest milk chilling centers (CC).

4.2.3 Annual Milk Collection by DDC

The DDC Milk Supply Schemes collect milk from 44 districts in the country. The milk shed area of each MSS covers five to seven districts. There are 200 thousand farm families supplying milk to DDC through MPC. MPCs are registered legal bodies as per the Co-operative Act. DDC is now collecting the milk from about 1200 MPCs (including own and private MPCs) from different schemes chilling centers (CC). The detail is presented in table (4.2).

Table 4.2: MPCs Supplying Milk to DDC Scheme

Schemes	Chilling Centre	MPCs	District Covered
KMSS	21	261	7
BMSS	10	146	9
HMSS	6	160	4
LMSS	8	79	4
NMSS	7	64	4
MPSS	7	29	8
JMSS	5	31	6
DMSS	1	18	2
Total	65	788	44

Source: Dairy Development Corporation, Government of Nepal, Annual Report (2015)

The milk collection network of DDC has spread from Panchthar in the East to Surkhet in the West. At present, the DDC has a milk collection network in 44 districts throughout the country. Milk collection is mostly concentrated in the Central region

followed by Eastern region and then Western region. Of the total DDC's milk collection, about 70 percent is collected from the Central region. Similar is the case with the private dairies. This is mainly because most of the dairies are operating in Kathmandu valley which is the major market for milk and milk products. DDC has also established the MSS (Milk Supply Scheme) in the Mid-western and Far-western region to collect the milk from rural farmers. This means Far-western region also have access to the formal milk marketing. Availability of transportation is another driving force to milk collection apart from the milk production. The road network in the country is increasing at the rate of 200 Km per year and the analysis of the relation between the added road length and milk offered by farmers has shown that every addition of one km of road can be expected to add nearly 39 MT of milk offered by the farmers for the reason that

Table 4.3: Annual Milk Collection by DDC

Fiscal Year	Milk Collection (in liters)	Annual Growth Rate (%)
2005/06	56305000	
2006/07	54120000	-3.8
2007/08	53684000	-0.8
2008/09	50641000	-5.6
2009/10	54059000	6.7
2010/11	56418000	4.36
2011/12	55509000	-1.61
2012/13	62138000	11.95
2013/14	65786000	5.87
2014/15	68943000	4.79

Source: Dairy Development Corporation, Government of Nepal, Annual Report (2015)

As shown in table 4.3; the DDC milk collection has been increasing trend in last 10 years period. The AGR (Annual Growth Rate) of milk collection in FY 2007/08 decreased by 3.8 and 0.8 percent respectively. Thereafter, the AGR increased slightly and reached in highest in the FY 2012/13 (11.95%). Similarly the AGR of DDC milk collection increased significantly in FY 2013/14 to 2014/15 (5.87% and 4.79 %). In the last 10 years the AGR of DDC milk collection increased by 17.8 percent. Among

the DDC's supply schemes KMCC collects the more milk and the DMCC less. The BMSS gets the surplus milk collected by HMSS and makes SMP.

Milk collection depends on condition affecting livestock and natural calamities like earthquake and flood. It's also depends on price formation; higher the price collection achievement would be high and vice-versa. DDC has experienced these both conditions in the past.

4.2.4 Raw Milk Transportation

The milk sell by individual household is very small; farmers usually carry milk by themselves to co-operatives in small containers, mostly small aluminum cans, buckets or jerry cans. From the co-operative to chilling centers, milk is carried in 30 to 40 liter through aluminum cans. Depending upon the distance and the road condition, milk from co-operatives to CC is transported by porters, tractors, vans, or other type of transporting vehicles or even mules and horses in the hilly regions. The traders collect milk in small containers from individual farmers and transport further in aluminum cans of varying sizes (usually 40 liters) depending upon volume of handling. The traders carry milk by themselves if the volume is small and use porters or vehicles for bigger amount. DDC and larger private dairies transport milk from CC to processing plants in insulated stainless steel road milk tankers. The co-operatives selling chilled milk in 40 liters aluminum cans. The means of transportation available in DDC in 8 milk projects are shown in the table (4.4).

Table 4.4: Means of Transportation Available in DDC

Name of MSS	Road milk tanker	Truck	Mini truck	Motorbike	Jeep	Tanker (in Fare)	Light vehicles
KMSS	19	-	8	2	-	-	8
BMSS	8	3	-	1	1	2	-
HMSS	8	1	-	3	-	-	3
LMSS	5	1	1	1	-	-	2
NMSS	3	-	-	1	1	-	-
JMSS	1	-	1	1	-	-	1
DMSS	2	-	-	-	1	-	-

Note: A dash denotes the nil in figure

Source: Dairy Development Corporation, Government of Nepal, Smarika, (2015)

As shown in figure (4.4), there are altogether 46 road milk tankers in DDC including in its central office, 5 trucks, 10 mini trucks, 8 motorbikes, 3 jeeps (especially for Tarai region), and 14 light vehicles in DDC. Sometimes DDC takes the milk tanker in fare and there are two milk tankers in DDC during this study period. These means of transportation play the role of collection milk, distribute the milk in concern milk booths to DDC office.

4.3 Production Performance of DDC

Based on projections of future demand for pasteurized milk, production targets are fixed by DDC in Five Year Development Plans and annual programs. Cheese and butter targets are fixed by estimating the milk available in the milkshed areas of cheese and butter production centers. Milk production was above 90 percent and butter was above 95 percent while cheese achievement was nearly 70 percent only. Milk production was dominated by KMSS following BMSS, JMSS respectively.

4.3.1 Capacity of DDC Milk Plants

The milk collected in different centers is pasteurized in respective plants. Raw milk is not the indicator of daily and annually production figure. As the demand for milk is increasing tremendously with the increase in population, income level, inflow of tourist and Hotels, etc; the aim of DDC is to meet the increasing demand utilizing its capacity maximum extent possible or expanding milk producing capacity. However in short run it is not possible to increase its productive capacity.

The total milk processing capacity in the country is estimated to be 650,000 liters/day of which the share of DDC's combined capacity is 182,000 liters/day (FAO, 2010). The capacity of DDC milk plant is shown in table (4.5).

Table 4.5: Capacity to Produce Milk by DDC Milk Plants

Milk Scheme	Supply Capacity (in liters/day)	Present handling (in liters/day)	Present capacity Utilization (in liters/day)
KMSS	90,000	147,000	163.33
BMSS	60,000	29,000	48.33
HMSS	18,000	9,000	50.00
LMSS	2,000	1,450	72.5
JMSS	12,000	14,50	12.08
NMSS	7,000	2710	53
DMSS	4,000	1800	45
MPSS	-	-	-
Total	193,000	187,900	444.24

Note: A dash denotes no availability of data in figures.

Source: Dairy Development Corporation Government of Nepal Annual Report (2015).

Except the KMSS, the DDC plants are running below the capacity. KMSS's capacity is over utilized by 63 percent .this is because of the higher demand for processed milk in the Kathmandu Valley. Due to the over-capacity utilization of KMSS, the DDC's overall capacity utilization has been pulled-up a little more than its total processing capacity. BMSS also includes a skim milk powder plant having a capacity of 3.5 metric ton per day. Similarly, LMSS has the facility of batch pasteurizing which can pasteurize 1,000 liters of milk in 3 hours.

4.3.2 Pasteurized Milk Production by DDC

Traditional milk production under mixed farming system is still predominantly operating in Nepal with small non-commercial holdings. Due to traditional farming system the cost of milk production is high as compared to neighboring countries. However, organized commercial dairy farming is increasing with start of the larger as well as medium sized dairy farms. The increment in farm obviously increase production of milk and milk products which may be consumed in the nearby market of the farm area.

Based on the projections of future demand for pasteurized milk, production targets are fixed by the DDC in five year development plans and annual programs. Dairy prod-

ucts especially cheese, butter, ice-cream, pannier, ghee are estimating the milk available in milk shed areas of cheese and butter production centers. DDC collects the raw milk from 8 milk projects and processed it from different chilling centers. As the aim to supply the pasteurized milk to the consumer, DDC produced the milk as shown in table (4.6).

Table 4.6: Pasteurized Milk Production by DDC

Fiscal Year	Production of milk in MT	Annual Growth (in %)
2005/06	67614	
2006/07	76266	12.8
2007/08	63536	-16.6
2008/09	66700	5.0
2009/10	71647	7.4
2010/11	72886	1.7
2011/12	85592	17.4
2012/13	62034	-27.5
2013/14	65344	5.3
2014/15	68936	5.4

Source: Dairy Development Corporation, Government of Nepal, Annual Report (2015)

As shown in table (4.6), there is an increasing trend of pasteurized milk by DDC in Nepal. The processed milk produced by DDC in the fiscal year 2011/12 increased maximum quantity (85592 MT), within the ten year period. This trend is moderately decreased in the year after 2012/13 and now again become high in FY 2014/15. Due to the spatial and seasonal variation in milk collection the production trend of DDC processed milk up-down and some year remained steady. Among the various product of DDC the processed milk is the top product to be demanded in the market.

4.4 Marketing Performance

People previously preferred only whole raw milk; however, after the advent of DDC and private dairies, there has been a gradual change in people's food habits with the increasing supply of pasteurized milk and modern dairy products such as cheese, butter and ice cream. Pasteurized milk is the prominent product of the dairy industry, as almost 80 percent of milk collection in the country's formal sector is used to produce processed milk (FAO, 2010). The market structure for dairy products may be separat-

ed into three segments: the rural or informal component, the urban or formal component, and the export component. The rural component of dairy marketing comprises the over 90 percent of farm households with dairy animals where most of the milk produced is consumed within the households either in the form of fresh milk or in the form of traditional dairy products. Some products are traded directly with consumers or through traditional collecting agents for consumption in urban areas or export to India. In the urban component of dairy marketing, most of the dairy products consumed in household and at restaurants and hotels are purchased from rural producers through several market networks.

4.4.1 DDC Sales Outlets

Milk- marketing agents include both private dairies and DDC supported outlets. A goal of any producer is ensure that the product reaches the ultimate customers. Therefore, distribution of any product to their respective places must be considered seriously so that the products are available to the consumer at the right time in the right places with minimum cost. To achieve this objective DDC has managed the different types of sales and distribution channels for its milk supply schemes as shown below:

Table 4.7: DDC Sales Outlets

Schemes	Milk booth	Franchise Shops	DDC own sales shops	Distributors	Dealers
KMSS	1400	-	-	2	-
BMSS	235	10	2	5	-
HMSS	210	-	-	3	21
LMSS	180	1	-	3	3
MPSS	-	24	-	9	-
JMSS	-	2	1	4	-
NMSS	66	-	-	-	-
DMSS	142	-	-	-	-
Total	2410	37	3	26	24

Note: A dash denotes the nil in figure

Source: Dairy Development Corporation, Government of Nepal, Smarika, (2015)

DDC has an extensive network of 2210 sales booths, 37 franchise shops 26 distributors and 24 dealers. Most of the sales centers are located in close proximity to the

schemes. Milk reaches consumers also through dealers appointed by DDC. Further, an informal channel also exists between DDC sales centers, booths and retail shops. Retail shops buy milk packets in bulk from booths or sales centers and supply to ultimate consumers. The larger institutional buyers buy loose milk or packaged milk in bulk directly from the processing plant.

Among the above sales outlets, some of the milk booths sell both the DDC milk and milk from the private dairies whereas the franchise shops, DDC shops and distributors sale DDC milk and milk products only. The processed milk is mainly pasteurized and converted to standard milk containing 3 percent and 8 percent SNF.

4.4.2 Packing

Most of the processed milk is marketed in plastic pouches. In the beginning, DDC started milk marketing in reusable glass bottles, which are not totally replaced by plastic pouches. The mechanized dairies have automatic pouch filling machines. Some have semi-automatic and a few have manual ones. Most of the dairies have similar looking package design with similar colors. Information provided on the milk in the packet varies by processor. Many dairies mention the composition of packaged milk. Some provide also the information such as date of packaging and temperature to be stored and some packages have only processors name.

4.4.3 Distribution

The term distribution refers to explanation of how prices for the services of productive resources are determined and how the total product of an economy is divided among the various productive resources.

The DDC distributes milk through a network of milk parlor run by DDC itself and milk booths operated by milk vendor on commission basis in urban areas. The milk is made available in such milk booths for few hours during the early in the morning and afternoon, while in case of milk parlor it is open throughout the day and deals with booth milk and milk products. The other strategy undertaken by DDC for its distribution of various milk products are franchise, dealer and distributors. These channels are provided with a fixed commission based on the dairy products they have purchased but there is no condition attached to them is they have to purchase at least minimum qualities of milk products per month as prescribed by the DDC.

4.4.4 Promotion

DDC programs promoting its products is very weak. It occasionally published some advertisements in local newspaper. Limited advertisements through wall painting, hoarding boards and milk transport tankers are also done. Some of the sales promotion activities practiced is discount pricing for factory delivery of milk credit sales to institutional and awards for milk booth men for selling more milk.

4.4.5 Pricing

Rising fluid milk prices are keeping with higher prices for many food categories including cereals, fruits and vegetables, and many animal products since the mid-2000s. Rising food prices, driven largely by rising incomes, urbanization, and demand for more diversified diets, is a key concern of policymakers (USDA, 2017).

The price of product in the market is an important factor influencing consumer demand. Hence to be marketable, a dairy product must be competitively priced. This implies that the cost involved in raw material procurement, processing, packaging, storage, marketing and distribution must be kept as low as possible. Government policy established a formula for payment of milk. Instead of a pricing system that values milk based on demand by product, season, quality and market location. Nepal has an established price system adjusted by milk shed, distance from factory and seasonality. Pricing system is based on fat, solid-not fat (SNF) and total solid (TS) in the milk. The dual-axis pricing system is implemented. In the DDC system, different price is fixed for MPCs belonging to various MCCs depending on the seasonal and spatial variation. This implies that higher price is fixed for lean season and lower price for flush season and higher price for MPCs operating under the nearer MCCs and lower price to the MPCs operating under the distance MCCs for the compensation of transportation cost (FAO, 2010).

4.4.5 Raw Milk Price

The price of the DDC changes from time to time. The Board of Directors of DDC has the sole authority of determining the prices of raw milk for purchase and the price of pasteurized milk and other dairy products. There is no special criterion to change buying and selling price. Generally it is determined on the basis of the change in the price of feeds in market to be provided for dairy animals. Although the DDC has been re-

sponsible for formulating and executing pricing policy, in practice it has to obtain government approval before implementing any price change.

Table 4.8: DDC Raw Milk Price

Component	Lean Season		Flush Season	
	Price range(NRs / liter)	Lean average (NRs./liter)	Price range (NRs./liter)	Flush average (NRs./liter)
Fat	5.40 - 7.06	4.72	3.31 – 3.98	4.65
SNF	3.38 - 1.78	2.58	2.34 – 2.74	2.54
Milk price to farmers (NRs./Liters)	28.89 - 32.54	30.22	228.27 – 28.82	30.55
TS commission (NRs./ kg)	21 -26	23.00	22 -26	30.00
TS commission (NRs./ liters)	4.35 – 2.86	4.60	4.34 -3.86	4.60
Price paid to MPCSS (NRs./ liters)	30.25 - 35.50	32.82	30.64 - 35.68	33.15

Source: Technical Division of Dairy Development Corporation (2015)

Table (4.8), depicts the price of milk for DDC accepted minimum quality of 5 per cent fat and 8 per cent SNF. The private dairies get the NRs.5.18/ liter as TS commission to compensate milk collection and chilling cost. Moreover, if the private MCCs deliver chilled milk to the DDC’s milk processing plant gets extra 1.46/liter to cover their transportation cost. Hence, the dual-axis pricing system exists and the same pricing system of DDC is followed by the private dairies.

4.4.6 Technology and Manpower

Manpower refers the different activities like personal need, requirement, selection, training and development, job description and evaluation, performance appraisal carrier development union negotiation and wages and salary, and administration. Manpower planning affects the annual profit for every enterprise.

DDC has two types of manpower i.e. administrative and technical. The employees are work as fixed salary and daily wage basis. The permanent employees get the fixed salary based on time. Besides this, there are few workers working on daily wage basis such as porter, collector etc. performance reporting, reward and punishment system of DDC is poor. As the informal dialogue to the DDC employees, there has political

pressure and government interfere on the selection, recruitment and promotion of employees. There is lack of authority delegation and decentralization because all the decision has made from the board where as board members are change with the change of government. The middle and lower level of employees have not involved in planning and decision making process. So, almost employees have not motive in their duty. Even though, the DDC and the NDDDB have provided different types of training programs for improving skill and knowledge.

Dairy processing is a complex task and it needs specialized manpower like dairy technologists, and dairy industry operates with medium level education in milk handling, processing, hygiene, equipment operation, product manufacturing, quality control and equipment maintenance (FAO, 2010). Automation technology is changing the way we produce milk, and the benefits are far-reaching: improved profitability, milk quality, lifestyle and animal welfare (Wadsworth, 2016). Thus manpower and technology are the two crucial factors in dairy industry. In DDC, there are both the new and advanced technology and qualified and trained manpower but in decreasing numbers. This leads to low quality product and the problem of product diversification. The manpower of DDC can be shown in table (4.9).

Table 4.9: Existing Manpower in DDC (2015)

Schemes	Types of Employees						
	Technical		Administrative		Others		
	Officer	Non-officer	officer	Non-officer	contract	Daily wage basis	Contract in short period
KMSS	20	209	10	26	-	27	41
BMSS	5	99	7	36	-	4	25
HMSS	5	73	4	29	1	4	14
MPSS5	5	127	5	33	2	21	28
LMSS	4	25	3	10	-	9	-
JMSS	2	20	2	2	-	5	13
NMSS	2	12	2	1	-	3	12
DMSS	1	4	1	1	-	-	14
total	44	569	44	137	3	73	147

Note: A dash denotes nil in figure

Source: Dairy Development Corporation, Government of Nepal, Annual report (2014/15)

The table (4.9) shows that there are altogether 794 employees working in DDC permanently. The number of technical employees is higher than the administrative. This is the good sign for DDC because it needs skilled technical staffs rather than the administrative one.

4.5 Financial Performance of the DDC

Financial Performance in broader sense refers to the degree to which financial objectives being or has been accomplished and is an important aspect of finance risk management. It is the process of measuring the results of a firm's policies and operations in monetary terms. It is used to measure firm's overall financial health over a given period of time and can also be used to compare similar firms across the same industry or to compare industries or sectors in aggregation. Firms and interested groups such as managers, shareholders, creditors, and tax authorities look to answer important questions like: What is the financial position of the firm at a given point of time? And how is the Financial Performance of the firm over a given period of time? The financial performance can be analyze through the balance sheet of the DDC, profit and loss account also use to see the financial performance.

4.5.1. Current Ratio

The current ratio is the relationship between current assets to current liabilities. It shows either the company is capable of paying back all its current liabilities or not. It measures the short term solvency i.e. its ability to meet short term obligation. Following table shows the current ration of DDC for the FY 2005/06 to 2014/15 as:

Table 4.10: Financial Ratios (Rs. in ‘000’)

Fiscal Year	Capital Equity	Borrowing	Grand Aid	Debt-Equity Ratio	Debt-Capital Ratio	Total
2005/06	549452	84251	331370	0.1	0.08	965073
2006/07	550802	83301	331370	0.1	0.08	965473
2007/08	550802	82351	331370	0.1	0.24	964523
2008/09	550802	79026	331370	0.1	0.08	961198
2009/10	670080	6650	331370	0.01	.006	1008100
2010/11	670080	3325	331370	.004	.003	1004775
2011/12	670080	-	331370	-	-	1001450
2012/13	670080	-	331370	-	-	1001450
2013/14	730080	-	331370	-	-	1001450
2014/15	730080	-	331370	-	-	1001450

Note: A dash denotes the nil figures

Source: Dairy Development Corporation, Government of Nepal, Technical Division (2015)

4.5.2 Debt-Equity Ratio (D/E Ratio)

For the DDC this ratio should be interpreted cautiously as most loans are soft loan from donor countries. The DDC borrowed considerable amount for the expansion of milk chilling centers in different parts of Nepal during the FY 2008/09 where the debt equity ratio is constant (0.1) since the FY 2005/06 to 2008/09. As the borrowing of DDC declined the debt ratio also declined. Higher the borrowing the debt-equity ratio also became high and vice-versa. After the FY 2011/12 DDC has no long term debt so the debt equity ratio also became zero.

4.5.3 Debt-Capital Ratio (D/C Ratio)

The debt-capital ratio of DDC has in decreasing trend since the FY 2005/06 to 2011/12 (0.08 to .003) respectively and it too, became zero after the FY 2013/14. This implies that DDC has no long term debt and it is operating well with the loan of donor countries and the government equity.

4.5.4 Profit and Loss Account of DDC

Profit and loss account is developing to report the financial result. It is a tool in accounting system which presents the operating efficiency of the organization. Profit is

the engine that drives the business. So the test of effectiveness of any is its profitability. Profitability ratio measures the worth of the selected investment in various categories of assets depending largely on sales performance and operative efficiency. Generally, higher value of profitability ratio shows better financial performance and vice-versa. Some of the major profitability ratios used under it is:

4.5.5 Net Profit Margin

Net profit margin establishes the relationship between net profit and sales of firm and measures the firm's ability to turn each rupees sale into net profit. This ratio provides considerable insight into the overall efficiency of the business. The net profit margin of DDC during last 10 years period can be shown in the following table as:

Table 4.11: Net profit Margin of DDC since 2005/06 to 2014/15

Fiscal Year	Net profit after Tax	Sales Income	Profit Margin
2005/06	40,298,342	1,589,663,476	-2.54
2006/07	25,541,921	1,536,340,564	-1.66
2007/08	14,702,531	1,680,353,715	0.87
2008/09	89,790,181	1,800,673,560	-8.0
2009/10	8,609,484	2,193,309,447	0.39
2010/11	25,810,924	2,628,350,971	0.99
2011/12	84,921,969	1,926,888,212	-4.4
2012/13	164,932,764	3,242,939,440	-5.08
2013/14	72,987,419	3,634,820,596	-2.0
2014/15	155,792,285	3,986,373,105	-3.9
Average			2.54

Source: Dairy Development Corporation, Government of Nepal, Technical Division (2015)

From the table (4.11), it is very clear that the profit margin of DDC is not good. It is almost negative for the last 10 years except in the FY 2007/08 (0.87), FY 2009/10 (0.39) and in FY 2010/11 (0.99) respectively, implies the minimum profit but in the rest of the years the net profit are totally negative which is not good for all the parties who are related to DDC.

4.5.6 Operating Expenses Ratio (OER)

The operating expenses ratio (OER) is a measure of what it costs to operate a piece of property compared to income that the property brings in. The operating expenses ratio is calculated by dividing a property's operating expense by its gross operating income and used for comparing the expenses of similar properties. The OER ratio of DDC for the FY 2005/06 to 2014/15 is presented below:

Table 4.12: Operating Expenses Ratio of DDC

Fiscal Year	Operating Expenses	Sales Income	OER (X)
2005/06	1,596,105,719	1,589,663,476	1.004
2006/07	1,545,090,764	1,536,340,564	1.005
2007/08	1,617,079,037	1,680,353,715	0.96
2008/09	1,809,185,238	1,800,673,560	1.004
2009/10	2,106,254,017	2,193,309,447	0.96
2010/11	2,519,933,916	2,628,350,971	0.95
2011/12	2,791,512,160	1,926,888,212	1.44
2012/13	3,234,433,985	3,242,939,440	0.99
2013/14	4,075,544,278	3,634,820,596	1.12
2014/15	5,328,389,700	3,986,373,105	1.33

Source: Dairy Development Corporation Government of Nepal, Technical Division, 2015

Table (4.12); shows the OER of DDC during last 10 years where the OER is highest in the FY 2014/15 i.e. 1.33 percent (133%) whereas the lowest one is in the FY 2009/10 i.e. 0.95 percent (95%). This ratio shows that the inefficient management of the operating expenses which ultimately increases in the total cost.

CHAPTER- V

DDC PRODUCTS AND PRICE TRENDS

5.1 Major DDC Products and their Price Trends

Milk and milk products can be important in diversifying the diet. They are nutrient dense and provide high quality protein and micronutrients in an easily absorbed form that can benefit both nutritionally vulnerable people and healthy people when consumed in appropriate amounts. DDC is engaged to the activities in milk collection, processing and production of milk products to the urban consumers. It is the prominent supplier of various dairy products to the consumers of urban areas like Kathmandu, Biratnagar, Hetauda, Nepaljung and Dhangadhi. The major products of DDC and their price trend since FY 2005/06 to 2015/16 has analyzed as follows:

5.1.1 Pasteurized Milk

Pasteurization is a process that kills harmful bacteria by heating milk to a specific temperature for a set of time. First developed by Louis Pasteur in 1864, kills harmful organisms responsible for such diseases as listeriosis, typhoid fever, tuberculosis, diphtheria and brucellosis (FDA, 2016). About 80 percent of the processed milk in Nepal is sold as pasteurized milk leaving only a marginal quantity for being converted into other milk products (FAO, 2010). Milk is a rich source of minerals such as calcium, vitamin D and phosphorous which are very important to develop human bones, but a glass of milk contains more other essential nutrients. Being a nutritious food, milk serves as an ideal medium for the growth of various microorganisms.

The quality of pasteurized milk sold in the various brands names in Nepal mostly comply with the legal standard set forth by Nepal Food Act in terms of fat and SNF content (NDDDB, 2016). However the DDC brand is most popular and its products are highly demanded to the consumer. The main objective of DDC is to produce pasteurized milk to the urban consumer. As a result, DDC collects the milk from 44 districts all over in the country and it has been producing pasteurized milk since the beginning. The pasteurized milk is highly demanded in the urban areas especially in Kathmandu valley. The quality of pasteurized milk sold in the various brands names in Nepal mostly comply with the legal standard set forth by Nepal Food Act in terms of fat and

SNF content. Here the price trend of pasteurized milk in 10 years has shown in the table (5.1).

Table 5.1: Price Trend of Pasteurized Milk by DDC

Year	Price (in NRs./liter)	Annual Change (in %)
2005/06	23	
2006/07	25	8.93
2007/08	27	8
2008/09	28	3.7
2009/10	32	14.2
2010/11	38	18.25
2011/12	43	11.7
2012/13	46	8.7
2013/14	48	4.3
2014/15	54	11.4

Source: Dairy Development Corporation, government of Nepal, Technical Division (2015)

The table (5.1) shows the price trend of pasteurized milk produced by DDC in 10 years i.e. 2005/06 to 2015/16. The price of DDC pasteurized milk during 10 years period is increased double. In 2005/06 the price of 1 liter pasteurized milk is almost NRs. 23/liter but in 2014/15 it has increased at the rate of almost 300 per cent that is nearly 54 NRs. /liter. This is due to the reason of increase in milk production cost and the increase in demand of pasteurized milk in urban areas.

5.1.2 Cheese

DDC has been producing mainly two types of cheese: Yak cheese (buffalo) and Kanchan cheese (cow) cheese but there are almost forty types of cheese are marketed in Nepal. Currently there are 6 Kanchan cheese centers and 4 pannier and mozzarella cheese centers operating by DDC. The Yak cheese is more favorable and highly demanded due to the fact that it contains the nutritional fats. The price trend of DDC cheese during the 10 F/Y can be presented in table (5.2).

Table 5.2: Kanchan Cheese Price Trend Produce by DDC

Fiscal Year	Price (in per kg. NRs.)	Change percent (%)
2005/06	259	
2006/07	248	4.2
2007/08	280	12.9
2008/09	316	12.8
2009/10	384	21.5
2010/11	412	7.2
2011/12	484	17.4
2012/13	544	12.3
2013/14	814	49.6
2014/15	840	3.1

Source: Dairy Development Corporation, Government of Nepal, Technical Division (2015)

Table (5.2) shows the price trend of cheese produced by DDC during Ten FY. The price of cheese has increased significantly since the year 2007/08 in every year whereas the producing of Yak cheese has declined. The price of cheese has remained 259 and in FY it has increased almost 4 times more i.e.840 in FY 2015/15. Hence, the overall cheese price has been increasing significantly. On an average the cheese price increased by 4.1 percent/kg annually, and the price increased by 224.3/ kg percent during the last 10 years period. This implies that the cheese is highly demanded in the market as it is one of the exported milk item to foreign country.

5.1.3 Yoghurt

Yoghurt is a traditional milk product, is produced by almost all dairies of varied sizes including the state owned DDC. There are mainly two types of yoghurt are available in the market; the sugar mixed ordinary yoghurt and special yoghurt with higher sugar and solid content.

DDC produced both types of yoghurt and sells it in main cities of Nepal including Kathmandu valley. The sale of yoghurt is seasonal, driven by festival and ceremonies and the dairies manufacture this product as per the order placed by customers. DDC packs it in single use 1.5 and 5 liter traditional clay containers. There is also available 1 liter and 200 ml plastic cups yoghurt produced by DDC.

Table (5.3) shows the price trend of sugar mixed ordinary yoghurt produced by DDC in last 10 years periods. Due to the strong competition of yoghurt in the market the price of yoghurt has increased steadily. During the FY 2009/10 the price has 14.8 percent than the previous year. This increasing trend remained continue for the FY 3012/13 thereafter price of yoghurt increased but in small increment. But when we see the 10 years period of yoghurt price it changed almost triple i.e.NRs.38.86/liter in FY 200/06 and this has increased by 126 percent i.e. NRs.88 in FY 2014/15. This small increment in DDC yoghurt price causes the competition to other private dairies' yoghurt as well as imported yoghurt.

Table 5.3: Price Trend of Sugar Mixed Ordinary Yoghurt Produced by DDC

Fiscal Year	Price (in NRs./liter)	Change percentage (%)
2005/06	39	
2006/07	38	0.86
2007/08	38	0.31
2008/09	44	14.8
2009/10	45	3.9
2010/11	57	26.1
2011/12	68	20.7
2012/13	75	10.2
2013/14	76	0.6
2014/15	88	15.2

Source: Dairy Development Corporation, Technical Division 2015

5.1.4 Cream

In Nepal the major buyers of cream are hotels, restaurants, bakeries and ice-cream manufactures. Cream is converted into butter of ghee or pasteurizes, packed and marketed as such DDC and other private dairies. Cream production is higher in flush season and lower in lean season. The price trend of cream produced by DDC can be shown in the following table:

Table 5.4: Price Trend of DDC cream

Fiscal Year	Price (in NRs./liter)	Change in percentage (%)
2005/06	109	
2006/07	106	-2.8
2007/08	115	7.82
2008/09	128	10.15
2009/10	150	14.50
2010/11	196	23.50
2011/12	232	15.50
2012/13	242	4.1
2013/14	252	4.4
2014/15	234	-7.69

Source: Dairy Development Corporation, Technical Division (2015)

The DDC cream has increased significantly year after year during the 10 years period as shown in table (5.4). The total changed percentage of cream is 88.8 and annual average percentage is 8.8. It means the DDC cream is highly demanded in the market. During 10 years period the price of cream has increased by 113 percent.

5.1.5 Ice-cream

DDC is the major players in the ice-cream industry, enjoying around 30 percent market share. DDC produced 1,000 liters of ice-cream per day in 10 different flavors from its three different production plant- in HMSS, BMSS and MPSS. Vanilla, Straw-berry, Chocolate, Pistachio are some of the popular flavors from DDC brands. DDC ice-creams come in 100ml, 500ml, one-liter, and four-liter packs.

Ice-cream is the product which the largest varieties are available in the markets particularly in Kathmandu valley. It is most popular among the children and youth consumers. There is an intense competition in the market among the selected brands and the imported brands. Kathmandu is the top most market for ice-cream and followed by Pokhara, Dharan, Biratnagar, Nepalgunj and other cities of Nepal.

DDC owns a continuous ice cream manufacturing unit however the various branded ice-cream are available in the market. The price trend of ice-cream can be shown in the table (5.5).

From the table (5.5), we come to know that the price of ice-cream has increased one year and after decreased in the next year. The reason behind this is the highly competition to other brands of ice-cream available in the market and seasonal variation in consumption of ice-cream. About 3/4th of total ice-cream production is consumed during summer season. Both locally produced and imported ice-cream is available in the market and there is tough competition between the brands name.

The price trend of DDC's ice-cream in the last 10 years increased by 50 percent i.e. in FY the price is NRs. 107/liter while in FY 2014/15 it increased to NRs.161/liter. This shows the upward trend sloping of DDC's ice-cream.

Table 5.5: Price Trend of Vanilla Ice-Cream DDC

Fiscal Year	Price of ice-cream (in per liters. NRs.)	Change Percentage (%)
2005/06	107	
2006/07	163	52.3
2007/08	154	-5.5
2008/09	165	-7.1
2009/10	121	26.6
2010/11	170	40
2011/12	170	0.0
2012/13	121	-40
2013/14	139	14
2014/15	161	15

Source: Dairy Development Corporation, Technical Division (2015)

5.1.6 Butter

Butter is another favorable product of DDC. Butter available in the market comprises of the locally produced DDC butter and private dairies butter. It is also imported from India and a little from European countries. DDC butter price has increased three fold in a decade as shown in the table as:

Table 5.6: Price Trend of Butter Produced by DDC

Fiscal year	Price of Butter (in NRs./kg)	Change Percentage (%)
2005/06	212	
2006/07	196	-7.9
2007/08	208	5.8
2008/09	235	13.0
2009/10	299	27
2010/11	360	20
2011/12	407	13
2012/13	470	15
2013/14	552	17
2014/15	615	11

Source: Dairy Development Corporation, Government of Nepal, Technical Division, (2016)

Table (5.6), reveals that the price of DDC butters has increased almost three fold during a decade. In FY year 2005/06 the price of one liters Ghee was NRs.211.50 and this trend has been increasing year after year and reached up to NRs. 615 per liters in FY 2015/16. Hence with the increased in demand the price of butter has also increased.

5.1.7 Ghee

With the increasing in the price of DDC butter, Ghee is also highly demanded to urban consumer. DDC Ghee is the well established goodwill product in the market. On an average DDC sells 1000 kg in Kathmandu valley. There is also highly competition in the market among the Ghee from DDC and other private dairies as well as the imported Ghee from India and Belgium. The “PATANJALI” brand and the “SHREE-SHREE” brands are also popular and highly competitive in the Nepalese market.

Table 5.7: Price Trend of DDC Ghee

Fiscal year	Price of Ghee (in liters/per NRs.)	Change Percentage (%)
2005/06	210	
2006/07	204	-2.8
2007/08	208	1.9
2008/09	233	12
2009/10	290	24
2010/11	370	27
2011/12	400	8.1
2012/13	430	7.5
2013/14	558	29.6
2014/15	624	11.9

Source: Dairy Development Corporation, Government of Nepal Technical Division, (2015)

Table (5.7) shows the price trend of DDC ghee where it has increased steadily during the FY 2007/08 but it has increased tremendously in FY 2008/09 i.e. (208/liter and 233/liter) respectively. Again it has decreased during FY 2012/13 (413/liter), and has increased upwardly since FY 2013/14 (557.50/liter) respectively. Among the locally produced ghee, the DDC dominated to other but the imported ghee also take good the market.

5.1.8 Pannier

Pannier is produced by almost all kind of dairies. Except for the DDC, the private dairies do not practice branding of pannier. DDC pannier is vacuum packed whereas pannier of the private dairies is usually packed in plastic bags with manual sealing. The major consumers of pannier are hotels, restaurant and sweet manufactured, besides the retail consumer. The pannier is seasonally demanded and goes higher in festivals and celebrations. Though the pannier is produced other private dairies besides DDC, it is imported from India by star hotels and restaurants. Like other milk products, DDC has producing pannier in negligible quantity since the beginning and still today pannier is one of the major products of DDC.

Table 5.8: Price Trend of DDC Pannier

Fiscal Year	Price (in NRs./kg)	Change (in %)
2005/06	200	
2006/07	160	-20
2007/08	239	33
2008/09	182	-31
2009/10	206	11
2010/11	266	22.50
2011/12	318	16
2012/13	317	-0.30
2013/14	349	9.16
2014/15	395	11.50

Source: Dairy Development Corporation, Government of Nepal Technical Division, (2015)

Table (5.8) shows the price trend of DDC pannier during last 10 years. The price of pannier ranges from NRs.200 to 392 per kg in 10 years periods of time. Since the fiscal year 2010/11, the price of pannier has increased highly i.e. NRs. 265 to NRs.318. The price of pannier is changed almost double in last 10 years due to the main source of nutrition and demanded highly.

5.1.9 Other Products of DDC

Besides these above products DDC also produces many sweet items like Rasbary, Peda, Skimmed Milk Powder (SMP), DDC fresh Milk, and Cow Milk and so on. The SMP is mostly used for industrial purposes that it is used to make biscuits and bakeries. DDC produces SMP but not sells in the market and used wholly by itself. Among the DDC products, the pasteurized milk, Yoghurt, Ghee, and pannier have taken the large market shares and have the higher price, whereas other products are smaller market shares and have the lowest price. Both the locally produced and imported products are available in the market DDC has able to established its own brand image. However its products could not meet the demand of consumers because consumer needs vary from person to person and also from time to time. So as to meet the consumer demand DDC has compiled to import the dairy products instead to export its products internationally.

Unlike in the global market, the consumers' price for milk and milk products in our country are rising. The price of pasteurized milk has increased by almost 150 per cent compared to the price of FY2005/06. Similarly, the price of yoghurt, whole milk, and pannier has increased more than 15 to 20 per cent annually. Once the price is raised, it generally does not fall as we have system of price fixing rather than determination through free market economies. This can be seen in the DDC milk and its products, too.

5.2 Market Share of Pasteurized Milk by DDC and Private Dairies

Pasteurized liquid milk is considered as the prominent product of the dairy industry in Nepal. Nearly, 80 per cent milk collection in the DDC is used to produce pasteurized milk. However the share of pasteurized milk marketing of DDC has declined compared to the private dairies during last 10 year since 2005/06 to 2015/16. This can be shown in the graph

Table 5.9: Estimated Processed Milk Sell by DDC and Private Dairies (MT/Year)

Fiscal Year	DDC Annual Milk Sell (MT)	Private Dairies Annual Milk Sell (MT)	Total Annual Milk Sell (MT)
2005/06	56,957	53,187	110,144
2006/07	53,328	55,846	109,174
2007/08	52,262	58,639	110,901
2008/09	52,049	61,571	113,620
2009/10	55,316	64,649	119,965
2010/11	58,082	67,882	125,963
2011/12	60,986	71,276	132,262
2012/13	64,035	74,839	138,875
2013/14	67,237	78,581	145,818
2014/15	70,599	82,510	153,109
2015/16	74,129	86,636	160,765

Source: Nepal Dairy Development Board (NDDB), Market Report, 2012

5.3 Supply of Milk Products by DDC

Though the demand of DDC milk and milk products is increasing day by day, the supply of milk and milk products is not able to meet the consumers' demand especially in Kathmandu valley and other urban areas of Nepal. Since the milk is perishable in nature and high water content, most milk in the world is not consumed in its original liquid form. Consumers prefer to consume some processed state like cheese, butter, yoghurt, and powder form. The food market in general and the dairy market in particular, are increasingly being presented in a wide variety of forms. The supply of some major DDC's products during 10 years periods can be shown in the following table:

Table 5.10: Supply of Milk Products by DDC (in Kg/ Year)

Fiscal Year	Butter	Pannier	Cheese				
			Yak	Kanchan	Processed	Mozzarella	Spread
2005/06	1,95,500	1,20,965	44,500	1,58,900	3,000	24,900	20,000
2006/07	2,52,000	1,56,610	42,040	1,63,127	3,300	39,250	3,600
2007/08	25,989	1,50,719	50,068	1,77,689	2,400	49,182	2,400
2008/09	282,306	161,750	49,000	149,000	2,000	63,200	7,000
2009/10	258	170	49	166	2	70	7
2010/11	2,72,308	2,57,200	57,000	2,10,695	1,800	1,12,900	1,000
2011/12	2,75,400	2,74,057	59,500	2,23,000	1,800	76,300	8,00
2012/13	2,73,358	3,30,227	57,730	2,23,453	1,800	2,8828	80
2013/14	2,6274	2,86,909	55,600	1,88,038	1,800	33,828	8,00
2014/15	3,50,477	3,07371	55,600	1,88,538	1,800	33,828	8,00

Source: Dairy Development Corporation, Government of Nepal, Technical Division, (2015)

Table (5.11) shows the supply of DDC milk products in the past 10 years. In urban market of Nepal, various brands of domestic produced as well as imported modern and traditional products are sold. Kathmandu valley is the major market for the dairy products. Dairy products are imported from more than 20 countries in Nepal. It means DDC products could not meet the demand and imported products are available in the market in varying size and affordable price.

Due to the poor infrastructure particularly road, DDC has initiated its MSS lately in the Mid-Western and Far-Western regions. The private dairies still do not have the collection centers in these regions. But the demand and supply for milk and milk products would be increased in these regions, too.

5.4 Problems Being Faced By DDC

DDC as the marketing arrangement of parastatal government organization has promoted the smallholder dairy farming which plays the critical role in generating cash income. It has been establishing milk chilling and processing centers in various places where farmers' group of cooperatives collect milk and deliver to the chilling and processing centers. But a greater part is channeled through the informal sector i.e. farmers sale to consumer by directly and private dairies. The operating costs of DDC are high and this can lead to a variety of problems. It has been facing some fundamental problems like existence of milk holiday during the peak milk production season. In this season DDC refuses of milk deliveries for almost four to five months. Such problems directly affect the smallholders' cash income from milk sales. To overcome this situation, DDC has established a milk powder factory with the technical assistance from the government of Denmark in 1973. This factory has helped substitute more than 50 percent of powder milk imported by DDC from abroad for producing liquid milk during lean season.

5.4.1 Shortage of Good Quality Raw Milk

The main problem facing DDC is the shortage of good quality raw milk whereas demand for its milk and milk products in the urban areas is increasing. In order to fulfilling the increasing demand for milk and milk products, DDC has expanded its milk collection network in distance rural areas of Nepal (GOEC-NDDDB, 2014). However, DDC is not engaged in executing neither milk production programs by providing technical or financial supports to the rural milk producers nor quality improvement programs in its milk shed areas except some newly introduced program in some pockets, which was implemented as Gai-Mai programme but eventually it is stopping now. In *Gai-Mai* program a milking cow was given to women household in a subsidized rate on installment basis in the selected milk production pockets of DDC.

Thus DDC is engaged in commercial activities of collecting milk from rural areas, processing it to milk and milk products and distributing them to urban consumers (FAO, 2010). Private dairies are also involved only in milk collection, processing and marketing of dairy products without any support program for the producer farmers, which is not in the line of AMUL pattern dairy development as aimed during its inception phase (GOEC, 2012).

5.4.2 Milk Holiday

The term “Milk Holiday” was coined in 1991 when the DDC could not buy all the milk offered, and refers to days in the week when public or private organizations do not buy milk from their regular suppliers (Upadhya, 2000). The reason may be limited consumer demand for the processed milk and milk products or lack of processing or shortage capacity of the dairy factory (Sharma & Baskota, 2005). Farmers are facing this problem in Nepal since 1991/1992. Milk holidays are largely a phenomenon of the flush season: September to March during which the supply of milk is four times greater than in the lean season. The lean season falls to the month of November to March. The key reasons for milk holidays are short supply of green fodder and to buffalo which calve during August to September; the calving season for cattle is more uniformly spread throughout the year. Farmers prefer buffalo due to their greater immunity to disease, greater capacity to absorb roughage, low risk, and low investment including their salvage value. Existing milk price system also gives higher value to buffalo milk on milk fat basis than to cow.

Another reason for occurring milk holidays is the imported cheap skimmed milk powder. Skimmed milk powder is entering the country at a price of less than NRs. 100/kg, far less than even the production cost in Nepal (NRs.169/kg) (Upadhaya, 2000). Considering this problem DDC has established the skimmed milk powder plant in 1992 in Biratnagar but this plant was not able to sell its products at reasonable price compared to the imported skimmed milk powder. Further, still today the DDC could not export the milk and milk products to foreign countries, nor met the demand for milk and milk products domestically. Rather it imports the milk products from neighboring countries. As revealed by milk collection quantity, flush and lean season ratio is 65:35. In DDC, LMSS had faced the first time milk holiday and it expanded to other schemes: HMSS, BMSS and KMSS. Currently this phenomenon has been occurring to NMSS and DMSS, too.

Thus, milk holidays are becoming an annual phenomenon in Nepal. The available evidence indicates that this is mainly a result of the inability of the formal dairy organizations to sell milk and milk products (Upadhayay, 2000).

5.4.3 Products Diversification

Even though products diversification is one of the major options for increasing the quantity of milk going through the formal sector, products diversification of dairy products in Nepal is not well developed. About 80 per cent of the processed milk in Nepal is sold as pasteurized milk leaving only a marginal quantity for being converted into other milk products (FAO, 2010). DDC could not substitute the imported dairy product through products diversification due to lack of limited qualified technical staffs for product development, lack of low quality raw milk, lack of assessment of market potentiality of different products and private sector introduced the new imported products owing to risk.

5.4.4 High Cost of Milk Production

Cost of milk production in Nepal is high because of factors such as low productivity per animal, poor feed and fodder supplies, inadequate extension services, poor research etc. internationally, the cost of milk production in Nepal is higher (by 50 per cent or more) than in the countries such as India, New Zealand and Australia (Pradhan, 2005). Dairy farming is still dominated by non-commercial farmers so the cost of milk production is higher than the neighboring countries. Due to the free entry of milk and milk products into market DDC cannot produce milk and milk products at a competitive price. On the other hand, the production of fluid milk is below the estimated demand. One of the reason as argued by the dairy farmer is low price of raw milk compared to increase in production cost in last decades. However, milk producer have opinion that they are not getting appropriate price of milk that is preventing them to produce more milk while on the other hand the consumers are saying that, the milk price is very high and beyond their purchasing capacity.

Based on the current data for milk processing and present raw milk purchase price, the total cost of processed milk/liter comes to be 51.01/liter. The sales price of processed milk is NRs. 56. Thus, the processing plants are expected to gain NRs. 4.99/liter of processed milk. Although, DDC also produced other milk products too, their sales in total revenue are very less being only about 20 per cent of the total revenue (NEPC, 2014).

5.4.5 Nature and Mechanism of Coordination

DDC has its own mechanism for information flow from MPCS to milk processing plants and then to the central level. There is no horizontal relationship between the DDC and NDA. Similar is the case with the CDCAN, which has no formal linkage with either DDC or NDA (FAO, 2010). As such there is absence of formal information flow between these three major actors and their lower levels units. DDC, being the government dairy industry, it is

5.4.6. Other Problems

A shortage of inadequate market information, inadequate number of chilling centers, poor quality raw milk, adulteration of milk and milk products, and frequent power outages are other problems facing by DDC.

CHAPTER-VI

SUMMARY, CONCLUSION, AND RECOMMENDATIONS

6.1 Summary

Dairy industry has been recognized as an important tool for development and poverty reduction and today it has accorded the status of a thrust area by the government. DDC, an undertaking of the government of Nepal has made significant contribution in bringing the gap between urban consumer and the rural milk production. The main objective of this corporation is to make available quality dairy products at reasonable price in every places of the country. DDC collects 80 million liters of milk from 44 districts annually; around 200,000 farmers are associated with DDC through 1200 milk cooperatives. The corporation sells around 180,000 liters of processed milk daily. It leads the dairy market which has 8 milk supply projects, 65 milk chilling centers, 16 cheese production centers under DDC.

Milk production plays a dynamic role in Nepal's agro-based economy. The installed capacity of the entire dairy industry is 1.20 million liters daily. It is estimated that the total investment in the sector amounts to Rs. 20 billion. Around 700,000 liters of milk is sold in the market daily which is 100,000 to 200,000 liters short of the demand. The sector provides jobs to around 3,000 persons while there are more than 40,000 beneficiary households. The Kathmandu Valley is a major market for processed milk, and about 75 percent of all the processed milk is sold here. Demand for milk and milk product has been increasing at the rate of 10 percent annually. About 90 percent of the total milk collection is sold as milk and the rest is sold as different milk products. DDC and private dairies account for 40 percent and 60 percent respectively of the milk sold. The per capita availability and consumption of milk and milk products in the country is far below the recommendation made by World Health Organization (WHO) and Food and Agriculture Organization (FAO) which is 250g/day. Extremely poor animal performance reflects the low productivity of milk production. Similarly, higher cost of milk production and higher consumer's price causes the low level of milk consumption.

Finally, this study reflected that DDC had failed to perform effectively and efficiently as its financial health is found unsatisfactory during the study period.

6.2. Conclusion

An attempt has been made in the present study to examine the performance of DDC, Nepal. This study has been undertaken with the following objectives in mind: (i) To examine the performance of DDC, (ii) To show the price trend of DDC products (iii) To identify the current problems and suggest appropriate measures to overcome them. The research questions undertaken in the study were: (i) whether the performance of DDC is satisfied or not as public enterprises? (ii) What is the price trend of DDC products? (iii) What kind of problems is facing the DDC at present and what will be the appropriate measures to solve these problems? Data has been collected from secondary sources and has been analyzed with the help of descriptive statistical and financial tools. Related literature has been reviewed at national and international context which consist books, reports, journals and dissertations. This study has been organized in five chapters consists of introduction, review of literature, research methodology, data analysis and summary, conclusion and recommendations.

The conclusions of the study are as under

- Dairy farmers, on average, supply around 700,000 litres of milk per day to dairy companies. But the country's daily demand for milk hovers around 800,000 litres. The country is currently facing shortage of milk because of lean milk production season. Lean milk production season stretches from April to August in the country. There is gap between the production and consumption of milk in Nepal. Nepal is importing nearly tangible amount of milk products from other countries.
- Most of the public enterprises of Nepal are weak performing whereas objectives are very good. DDC has too, vague objective but it is not strictly followed.
- DDC had concentrated its whole efforts on the survival of the corporation and its activities are limited only to milk collection.
- DDC has no fair system of rewards and punishment to employees on the basis of their performance.
- The top level management/ executive are only involved in planning and decision making and lower level participation is not encouraged.

- The price of milk and milk products of the DDC remains the same throughout the country for all seasons but the milk purchasing price of DDC varies seasonally. In flush season the raw milk price is lower due to enough milk availability.
- Lack of budgeting expert and skilled planner, plans are formulated on traditional basis.
- No proper management to supply the sufficient milk in the urban areas because of the difficulties in collecting surplus milk in rural area.
- DDC had no any effective programs to achieve desired and formulated goals and objectives and to overcome the existence problems and challenges.
- There are no joint efforts between NDDDB, DDC and private dairy to achieve the goal of product diversification.
- Over staffing, under- capitalization and government intervention are the main causes of DDC to achieve the specific and satisfactory goal.
- Cheese production is a specialty product of DDC, particularly yak cheese, has remained the neglected area in terms of promotional activities and incentives to the farmers.
- The net profit margin throughout the study period almost seems negative which not good sign is for all the interest group of DDC. Similarly, the operating expenses of DDC are almost 100% i.e. whatever the sales are made are just able to meet the operating expenses.
- Although, the volumes of production and sales have increased continuously, the DDC has suffered increasing losses. Some factors responsible for losses are:
 - a. Government control of prices: though the right of fixing price is provided by DDC, the decisions are later approved by the GoN. Judicious fixation of milk procurement and sales is of utmost importance to the DDC's viability. The sales price should be fixed on the basis of cost of procurement, collection, transportation, processing, sales and overhead.

- b. Milk loss during collection: As payment to farmer is made according to the quantity and quality of milk they supply, any milk loss directly causes financial losses. There may be losses from village and transfer of milk from one container to another. The DDC had allowed loss of 5 percent of total fat collected by KMSS from collection centres to the factory and a new norm of 4.5 percent has been fixed. For other milk plants collection losses of 2 percent are tolerable. This system seems unwise because it is difficult for an employee to compensate a loss of even 1.5 percent. In practise, employees compensate by underweighting milk, by adding water.
- c. Expansion of the collection areas and establishment of new milk supply scheme projects
- d. Gap between flush and lean season to milk collection: Milk production in Nepal has high seasonal fluctuation because of variation in green fodder grass availability. More than two-thirds of milk is collected in the flush season. Milk collection costs increase significantly in the lean season. Collection and transportation facilities are established according to flush season collection.
- e. Handling loss during processing: The DDC has incurred substantial losses as a result of lack of vigilance and inefficient operation. Handling losses have been reduced over the last decades. In the KMSS they have decreased from 6.23 percent in 2006/07 to 1.53 percent in 2014/15. This could be attributed to vigilance and improvement of operation of operations at the dairy plant. One of the major sources of handling losses is receipt of coagulated milk and spillage during operations.
- f. High production costs for cheese and butter: Unlike milk supply schemes, in cheese factories increased production does not add much cost except the cost of milk and cheese and butter transportation cost.
- g. Addition of manpower/overstaffing: Almost all DDC units are overstaffed, except for the cheese factories. This leads to laziness, indisci-

pline and indifference. Non- technical staffs have increased faster than technical staff and many technical officers are in the KMSS rather than their services are required in the other MSS.

6.3. Recommendations

On the basis of this study, the researcher would like to draw the following recommendations to present and future problems faced by DDC, which are as follows;

- i. In order to improve the DDC's financial position and eliminate loses, GoN should grant autonomy to the DDC to revise the sales price of milk so it can cover costs of collection, processing and distribution. The consumer milk price should be increased along with increases in the producer price. Nevertheless, the consumer price should be fixed as low as possible. If GoN of Nepal is committed to pay higher prices to rural producers and sell milk at a reduce rate to urban consumers, budgetary provisions or a subsidy should be provided to the DDC. The DDC working capital is also depended on GoN equity. However, there has been a declining in GoN's contribution which has adversely affected working capital. GoN should make annual budgetary provisions to provide equity to the DDC.
- ii. Approved technology in cattle and buffalo production and management could be an instrument to increase production and productivity. Hence it is recommended to conduct functional tailored made training on feeding, breeding care, management, disease prevention and control by DDC. Product diversification is limited in Nepal, and more than 90 percent of the processed milk is sold as pasteurized fluid milk while only a small part is sold as milk products. Recently, a private processor has started producing ultra high temperature (UHT) milk and drinking yogurt. Due to the dominant role of DDC in the market, the private sector does not seem to be prepared to make additional investments needed for product diversification. So, DDC should be considering the product diversification. Most dairy entrepreneurs do not possess technical knowledge nor are they capable of hiring qualified technical manpower. Reports reveal that the shortage of technical staff is more severe in the private dairy sector compared to DDC. Therefore, it is also necessary to popularize and promote

insurance schemes among milk producers. They should be educated to reduce infertility problems among cross breeds.

- iii. Increasing costs of production are a matter of great concern for the DDC management. Collection, processing, distribution and other costs are also increasing. DDC should be conducted a study on cost reduction. Similarly, DDC should expand the collection and distribution scheme all over the country and it should provide the loan for rural poor farmer to keep cattle.
- iv. DDC should define short- term and long- term planning and its problems, strategies, goals, targets etc. and it should be consider demand of its products, market survey at the time of making plan. And it also should consider the price, supply, capacities and policies of other private dairies.
- v. There should be effective advertising policies to inform about the dairy products and its quality for the consumers. DDC should follow the participative management for planning and decision making and it should applied scientific inventory system.
- vi. There should be greater efforts to increase milk production to meet increasing demand. Effective programs should be implemented by the DDC, and these programs should support farmers by providing feed and fodder availability, improving veterinary services, training farmers, providing loans to purchase buffalo and providing remunerative prices for produce.
- vii. Private dairies are only producing products which have a good profit margin but not the pasteurized milk even though there is a good market. If the DDC has to compete with private vendors and dairies, adulteration in milk must be discouraged. Arrangements should be made to spot check quality of milk sold by private vendors and offenders should be penalized .private dairies should be asked to produce a certain percent of pasteurized milk out of their total handling.
- viii. The DDC should be careful about adding capital and manpower. The result of adding more of both of these factors of production has been costly. Addition of capital and manpower should be done only with a well-defined purpose related closely with production, collection and distribution.

- ix. The DDC should run the existing plants efficiently and utilize idle equipment. Moreover, DDC should establish the new plants as used as foreign neighbour countries.
- x. The DDC should emphasis to cheese production by supervising the yak cheese factories regularly with the help of skilled dairy technologist and should providing soft loan to the farmer who wants to keep yak and Chauri because yak cheese is only one product which can be exported all over in the world.

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ANNEX-I

BOARD OF DIRECTORS (BOD) OF DAIRY DEVELOPMENT CORPORATION IN PRESENT YEAR -2074

S.N	NAME	POST
1.	MR. RAGHUNATH GAUTAM	CHAIRMAN
2.	MR. BABUKAJI PANTA	MEMBER
3.	DR. BANSHI SHARMA	MEMBER
4.	MR. NARA BAHADUR THAPA	MEMBER
5.	MR. DIPENDRA BAHADUR KUNWAR	MEMBER
6.	MR. BABURAM ADHIKARI	MEMBER
7.	DR. BISHAL BASTOLA	MEMBER
8.	DR. ISHWORI PRASAD ADHIKARI	MEMBER
9.	MR. TEJNATH DHAKAL	MEMBER